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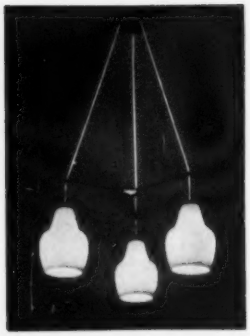
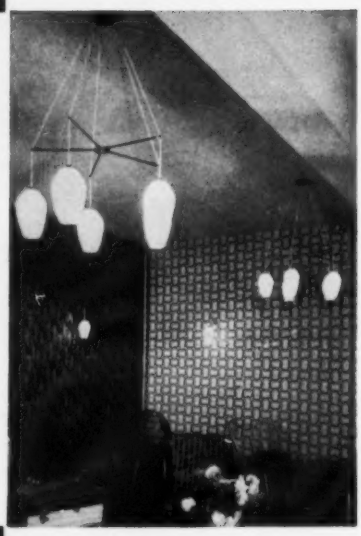
Light and **Lighting**

November 1960

The Leas, Folkestone, during the week of the APLE Conference; it is by this scene, more than any other, that the 1960 assembly will be remembered. Our reports of conference and exhibition start on page 299.





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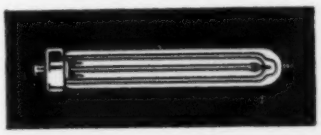

Lighting installation at St. Mary's Gate, Sheffield. Stella Sodium Lamps are used in Phosco fittings spaced at 120 ft. and at a height of 25 ft. Photograph reproduced by kind permission of J. Woodhouse, Esq., Public Lighting Engineer, Sheffield Corporation.

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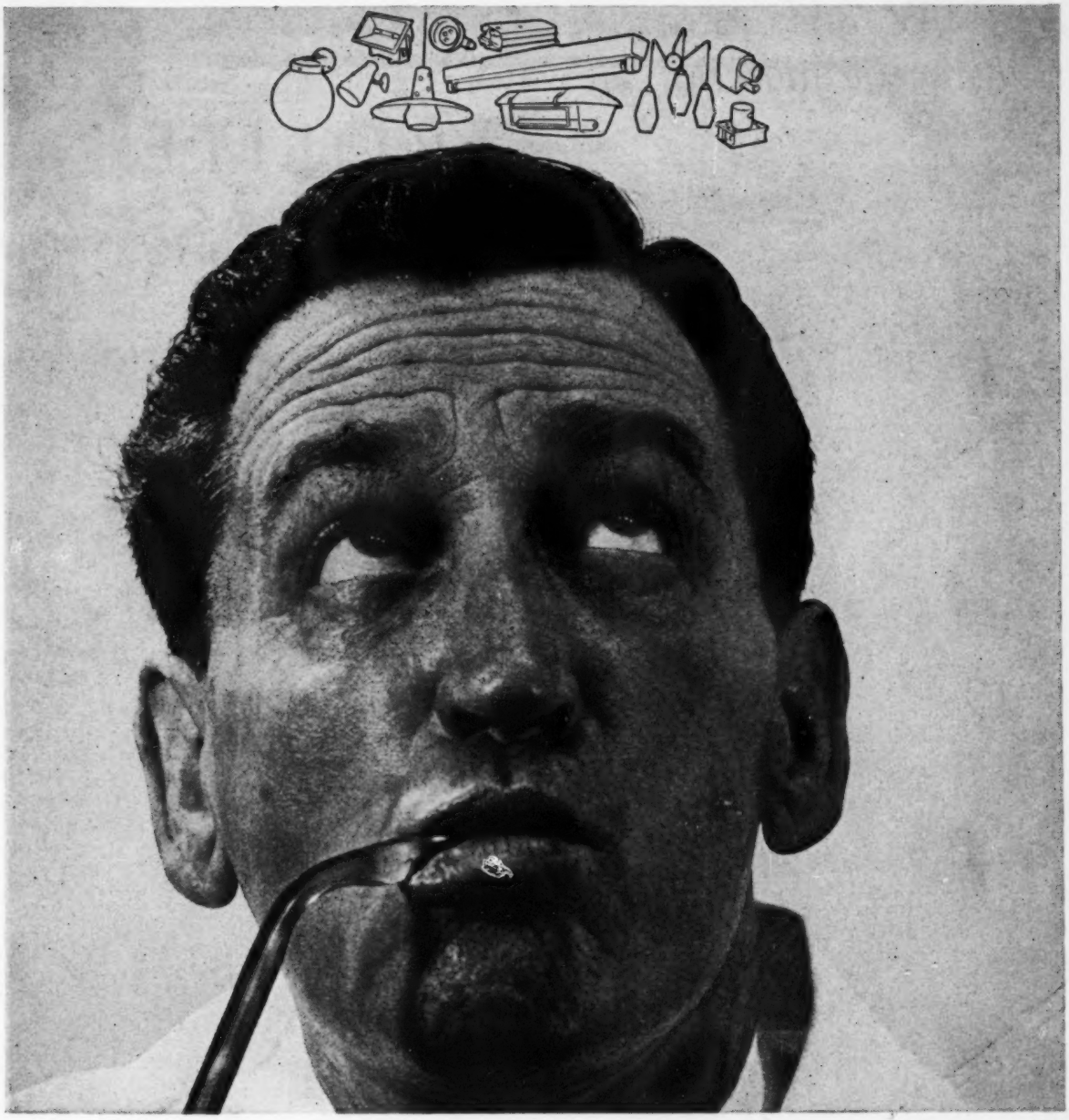

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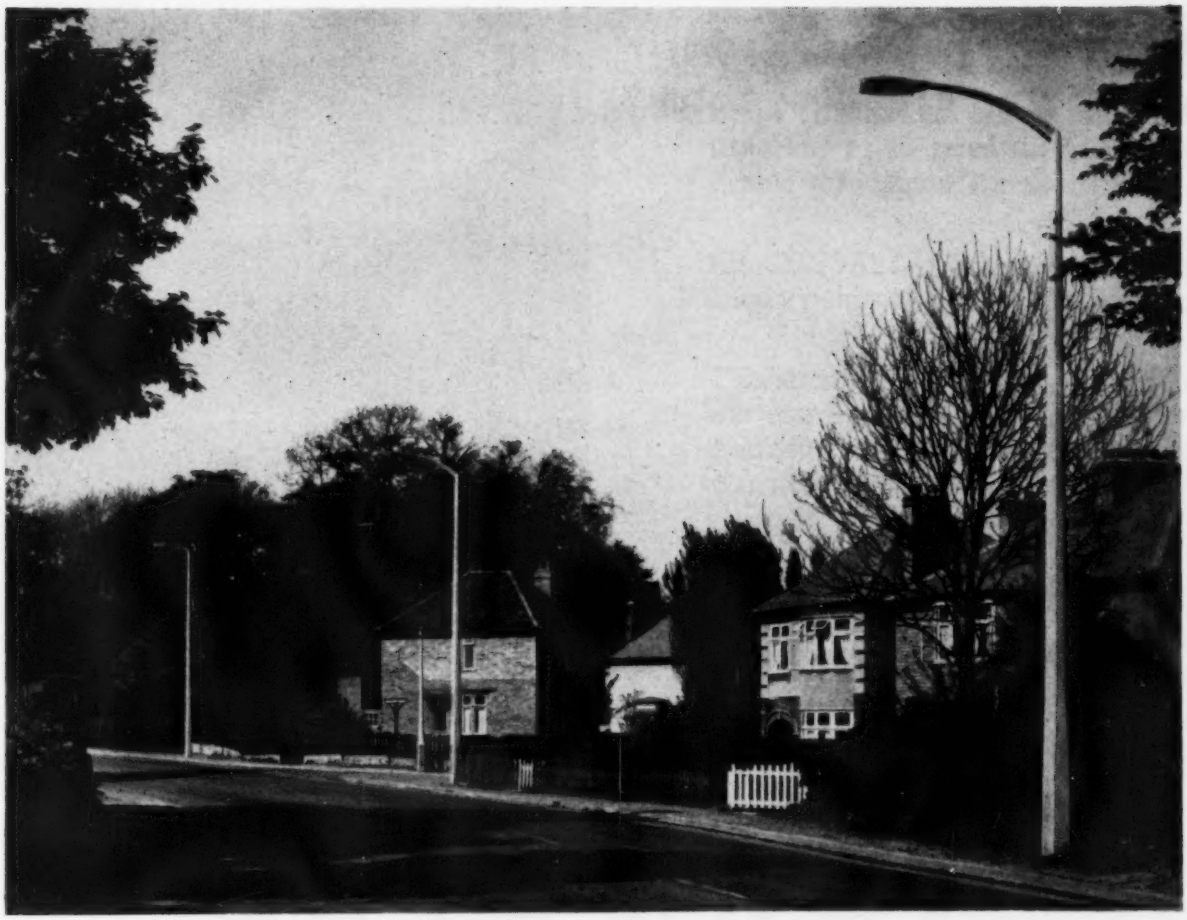

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Stanton Type 8F Spun Concrete Lighting Columns at Swanwick, Derbyshire, fitted with Atlas Alpha I Sodium Lanterns.

Photograph by courtesy of F. P. Walters, Esq., Engineer, Surveyor and Water Engineer, Alfreton U.D.C.

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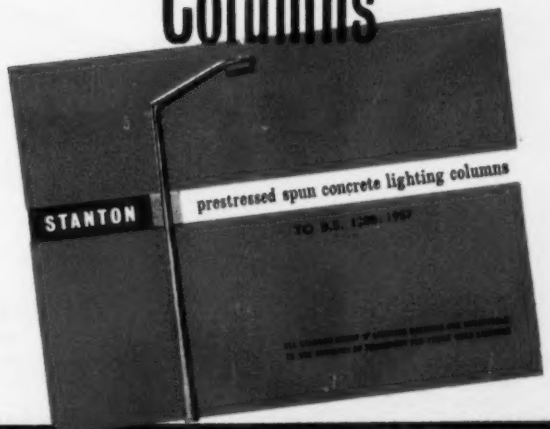

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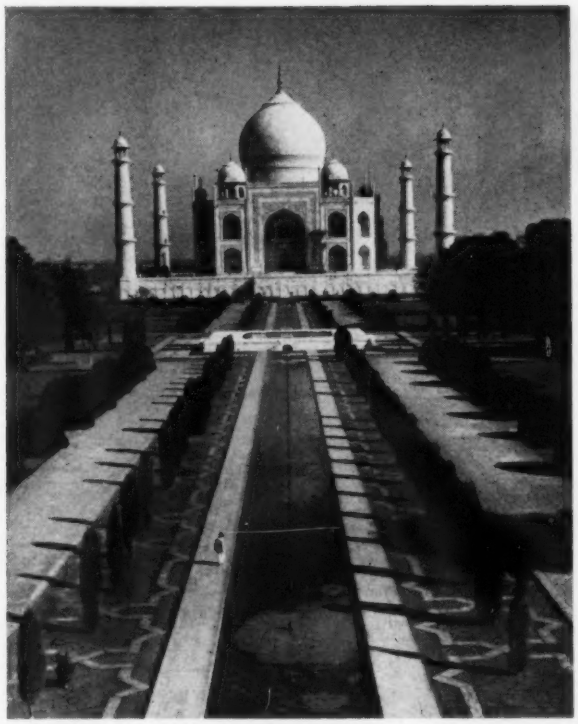

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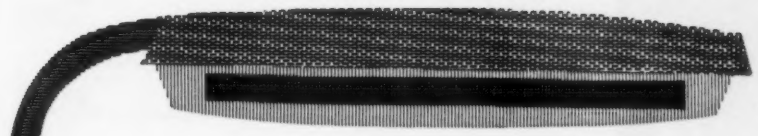
Service by Rickshaw in Durban, South Africa (Photo by J. Allan Cash)



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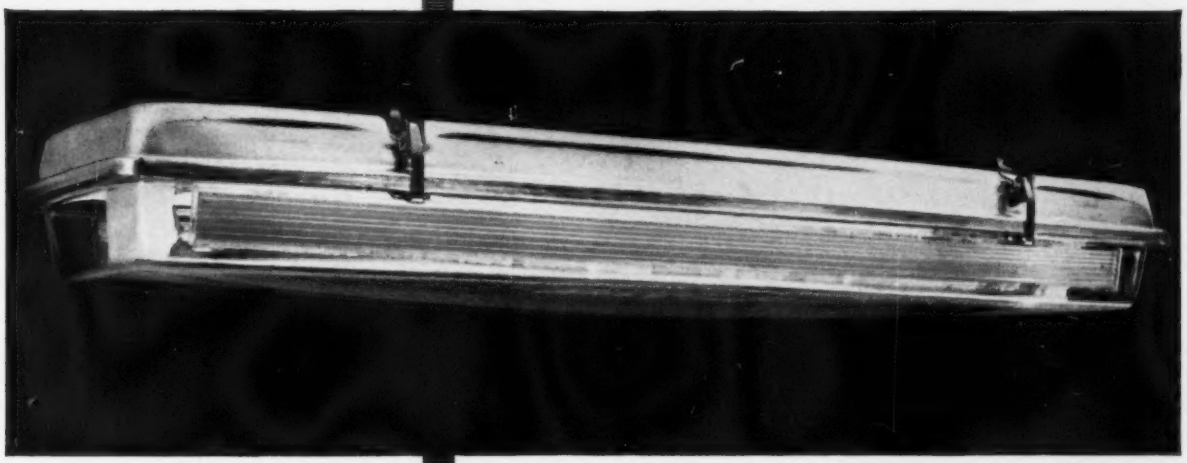

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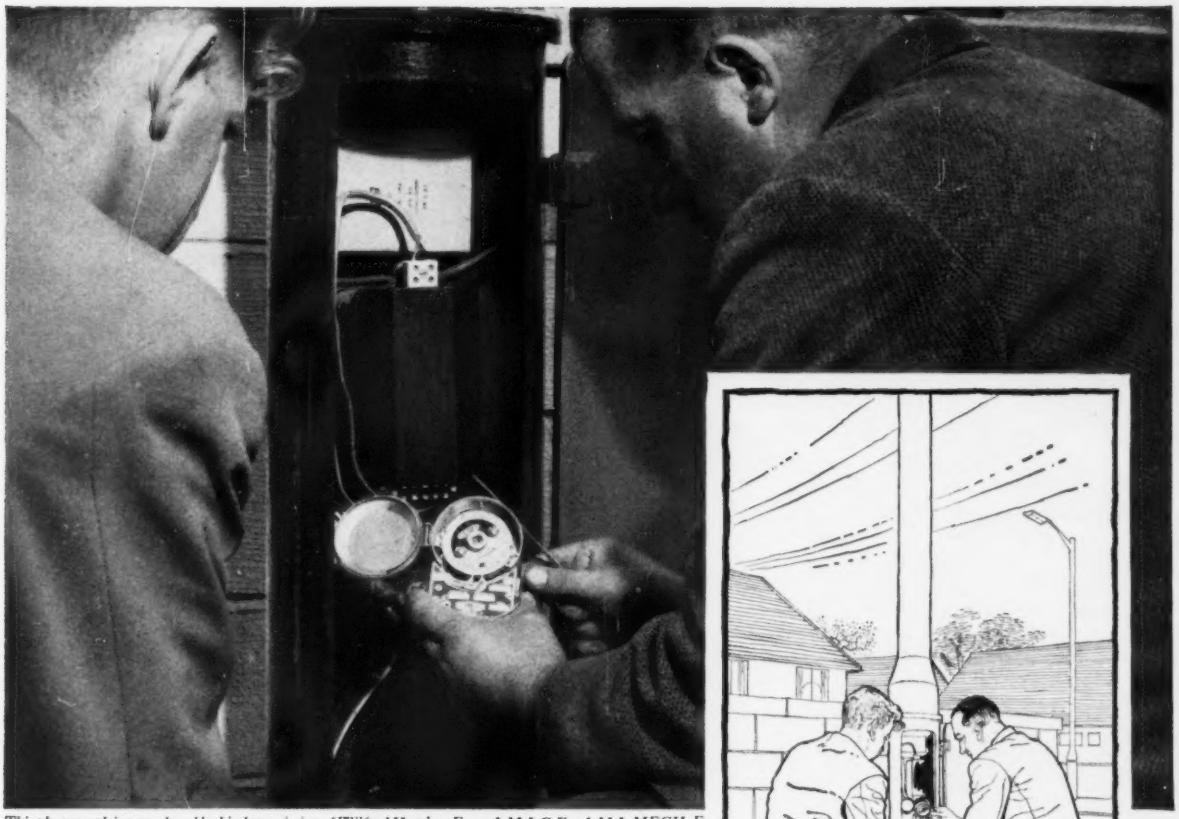

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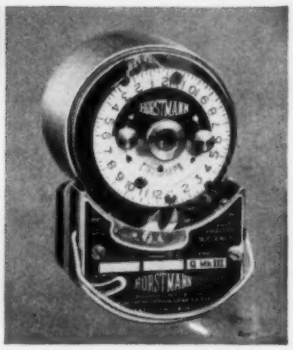

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HG 7

Light and Lighting

Vol. 53 No. 11

CONTENTS

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Night Driving Seeing

As all street lighting exists for the purpose of enabling road users to see more or less adequately and, in particular nowadays, to enable fairly rapidly transported road users to see well enough, it is obvious that fitting the lighting to the road users involves knowing pretty well what these users need to see. Not enough studies of the right kind have yet been made to analyse the visual task in night driving most effectively, but one of the highlights of the recent APLE conference at Folkestone was Mr J. M. Waldram's contribution on this subject. What the road user actually sees or needs to see is—as Mr J. G. Holmes also stressed—the most fundamental problem of street lighting. Fortunately, besides such veteran investigators of the problems of street lighting as Mr Waldram, the Road Research Board is doing invaluable work on these problems on a scale quite beyond that which any other organization could attempt. Through its special committees, such as that on Street Lighting, and a joint one with the Medical Research Council on Road Users, it keeps in touch with and seeks the advice of persons who have relevant specialist knowledge or experience, and its staff of scientific and experimental officers copes every year with a most extensive programme of research. One interesting investigation reported in the Board's latest annual report was concerned with the effect of the number and type of irrelevant lights encountered by drivers on the time taken to respond to signal lights. This is an important matter in urban areas.

Notes and News

THE OPENING MEETING of the Illuminating Engineering Society's London programme for the 1960–61 session was a very impressive one with a fuller agenda than is usual on such occasions. The first duty of Mr Campbell, who was in the chair for the first part of the evening, was to welcome the President and Secretariat of the International Commission on Illumination and the members of the Scope Committee of the CIE who were attending a series of meetings in London and who were able to include in their very full programme attendance at the IES meeting. They included Mr Ivar Folcker, the CIE President, Prof Yves le Grand, Monsieur Jean Chappat, Prof L. Schneider, Mr Ib Ovesen and Dr D. Vermeulen. Including in his welcome also Dr C. T. Hecht from Bogota, Colombia, Mr Campbell said it was seldom that the Society was able to welcome so many visitors from so many countries at one of its sessional meetings.

The next item was the presentation to Dr S. English of a certificate of Honorary Fellowship of the Society, this honour having been conferred upon him in recognition of his services over many years to the IES, of his many contributions to the science of lighting and in appreciation of his work in the international sphere. Dr English was president of the Society in 1937 and has led the British delegation at a number of meetings of the International Commission on Illumination. His connection with Holophane Ltd, which he joined in 1927, is well known and he is at present chairman of the company. In acknowledging the award, Dr English said that though it might appear that the subjects discussed at the Society's meetings were very similar to those which it had discussed even thirty years ago, the extent to which these subjects and the study of them had developed was indicative of the very valuable work done by the Society which he congratulated on the development of its growth and influence.

The Leon Gaster Memorial Premium awarded annually for the best paper presented to the Society was then presented to Mr H. C. Weston.

Dr Stiles then presented his presidential address.

Lighting and Research

DR W. S. STILES, OBE, FRS, is well known, both in this country and internationally, for his research on the phenomena of vision. Some thirty years ago he carried out basic work on glare and with his colleague, Dr B. H. Crawford at the NPL, he discovered the peculiarity of the eye now always referred to as the Stiles-Crawford effect.

It was therefore natural that he should choose as the theme of his presidential address the subject of research in lighting, but he did not at all confine himself to describing investigations concerned with the eye. In fact, he began by saying that it was in the development of new sources of light that research had produced the most far-reaching consequences in the lighting field. In the first part of his address, therefore, he explained how outstanding advances in light sources, such as the introduction of gas discharge lamps and the use of solid phosphors, had occurred side by side with developments in the scientific field, notably the upsurge of quantum ideas on matter and radiation and a rapidly growing interest of physicists in the solid, as distinct from the gaseous state of matter.

After referring to the work which led to the establishment of the mean sensitivity curve of the eye and that on which the international (CIE) system of colour measurement was based, Dr Stiles mentioned the research now in progress on the colour-rendering properties of light sources. This essentially visual problem led naturally to a consideration of the work now being actively pursued on the very complicated mechanism by which we saw the world around us. The objects of study included the light receptors in the retina and the photo-sensitive pigments they contained, the way in which nerve pulses were started in the retina, passed along the optic nerve to the brain and were there translated into visual sensations. Here Dr Stiles showed a number of slides of the structure of retinal rods and cones. He then passed on to deal with the photo-sensitive pigments, visual purple being only one of these although the best known. The story of the way in which these behaved under the action of light was a complicated, but fascinating story. At this stage, said Dr Stiles, there was a gap in our knowledge but the trail was taken up again in the nerve fibre where, by an almost unbelievably delicate technique, it was possible to study the electrical impulses caused by what took place in the retina.

Next Dr Stiles described some of the work being done at Reading on the important part played in vision by involuntary eye movements. He concluded by pointing out that while research on light sources could be stimulated by the prospect of an end-product of direct commercial value, this was not possible with research on visual problems. It was therefore the more interesting to note that such problems had, nevertheless, been persistently attacked by research workers who had the application of the results of their work firmly in view. A mention of the

work currently in progress at Government laboratories, universities and elsewhere completed Dr Stiles's survey.

Berlin Building Weeks

AS ANNOUNCED IN our September issue, the two opening days of the Berlin 'Building Weeks', September 15 and 16, were devoted to the reading and discussion of papers on the use of lighting in buildings. The meetings, attended by some 250 architects and lighting engineers, were opened by Dipl.-Ing. R. Schwedler, Senator for Building and Housing, who emphasized the important part played by lighting in architecture.

The first paper was by an engineer, Prof H. Noth, who brought back from visits abroad, particularly in the USA, a keen appreciation of the value of team-work in building, with a lighting engineer as a member of the team. The lighting should be an integral part of the building scheme as a whole, not a separate ingredient added to it. Herr Ströbel, an architect, followed with a reference to the fact that without light there could be no appreciation of architecture, but this emphasized the lighting of architecture rather than the use of light in architecture which was really the theme of his paper. Lighting was a building material to be used, like other materials by the architect in designing a building. He illustrated his point by showing some examples and others were added by Herr Ott during the course of the discussion. Dr W. Köhler went into the matter further in a paper entitled 'The bases of collaboration between the architect and the lighting engineer', in which he discussed the physical, physiological and psychological aspects of lighting. He, too, showed slides illustrating the development of a 'lighting style' into an art genre. During the discussion Herr Thum demonstrated the use of models for studying lighting effects.

The second day began with a paper by Herr E. Dahme on the use of artificial light as an adjunct to daylight, with particular reference to school classrooms. He said that from October to March supplementary artificial lighting was needed for 40 per cent of teaching hours. The colour of the light was very important and the influence of the light reflected from walls and ceiling was considerable. A paper on colour was read by Herr G. Neuke of the Institute for Colour and Form Rendering, at Frankfurt, and this gave Dr Münch an opportunity to stage some demonstrations of colour-rendering effects. The final paper was by an architect, Herr H. H. Giebeler of Hamburg, who spoke on 'building with light, in theory and practice'. He emphasized that the lighting must be considered side by side with the heating, ventilation and furnishing of the building. In the term 'lighting' he included both daylight and artificial light; both were equally the concern of the architect. At the conclusion of the meeting Herr Gründler described a recording illumination photometer installed in the Lighting Institute of the Berlin Technical University, while a new luminance meter was shown by Dr Buchbinder.

Electrical Accidents in 1959

FROM THE ELECTRICAL SAFETY ASPECT, lighting occupies little of the Factory Inspectorate's *Report on Electrical Accidents and their Causes*, 1959, published recently by HMSO. In its review of developments in that year, the report refers to the danger of touching the screw portion of screw-cap lamps, which has arisen with the more widespread use of infra-red lamps for process heating and medical treatment. Since these lamps are used in batteries instead of shades, variations in the design of lamp caps may make them unsuitable for use in lampholders fitted with a protective skirt. Some medical treatment lamps are completely unprotected and fatal accidents are known to have occurred. As the precautions necessary for safety are unchanged, the report points out, there is every reason for regularizing the subject through standardization. Another problem has arisen with the new miniature screw-cap lamps used for Christmas and similar decorations. They have caused two fatalities, one in a factory during testing, the other to a child at home. Some of these lamps have no proper lampholder at all, and the report stresses that every effort should be made to protect the public by keeping such dangerous goods off the market. On the statistical side, the report shows that there were 595 accidents reported in 1959 (excluding cases of welders' conjunctivitis or 'eye-flash'), of which thirty-four were fatal. These included three deaths from portable lamps, out of a total of twelve accidents involving such equipment. Fixed lamps were the cause of nineteen accidents, none fatal.

Road Research

THE REPORTS of the Road Research Board and of the Director of Road Research for 1959 have recently been published under the title 'Road Research 1959' (HMSO, price 7*s*.). This publication should be studied by all who are concerned with roads and road safety and street lighting engineers might well take note of the warning given regarding the problems that will arise in the near future due to increasing traffic on the roads.

Of particular interest in the Report of the Board is the recommendation that motorway intersections should be lighted and that experiments should be conducted on the lighting of motorways throughout their length. The Report of the Director of Road Research describes some trials on low-level lighting in the neighbourhood of motorway intersections. The document reminds us once again of the valuable work being done by the Road Research Laboratory.

The contribution of 'public' lighting to the night-time scene is clearly brought out in this picture of Gourock on Clydeside. The light from streets and buildings has in fact created the scene, giving an impression of a seaside resort rather than an industrial town. Much of this issue is concerned with the functional aspects of street lighting; the above picture serves to remind us that public lighting has a wider interpretation.

APLE Conference 1960

THIS YEAR'S CONFERENCE OF THE APLE was held at Folkestone from September 13 to 16, when over 1,200 delegates, including representatives of some 340 local authorities, met under the presidency of Mr F. C. Smith, MBE, a past president of The Illuminating Engineering Society and a member of the committee responsible for the Code of Practice on Street Lighting.

The programme was fuller than usual, including not only a number of papers of exceptional interest but also a 'forum' (the BBC would call it a 'brains trust') at which questions submitted by those present were discussed by a team of experts.

The Conference was opened on Tuesday morning by the Mayor of Folkestone, Ald. F. W. Archer, who, on behalf of the Corporation and citizens, extended a warm welcome to members of the Association and other delegates. For many years he had had professional contacts with lighting engineers and so he felt especially gratified that the APLE should have decided to pay Folkestone a third visit.

The retiring president, Mr R. Parker, thanked the Mayor for his welcome and went on to express his thanks to the members of Council, the officers of the Association and all who had made his year of presidency such an enjoyable one. He then invested Mr Smith with the chain of office.

The new president said that the Association was deeply indebted to Mr Parker for the time and work he had devoted to its service and he expressed the thanks of all the members to him and to Mrs Parker. He then announced that the new vice-president was Mr J. H. Morrison of Bolton who had been a member for more than twenty years. At this point Mr Smith said that they proposed next year to break with custom. It was usual for the vice-president to succeed to the presidency, but in 1961 it would be twenty-five years since Mr Lennox had become president and the Council felt that it would be a fitting recognition of the work he had done for the APLE if he were then to be nominated for a second term of office and Mr Morrison had expressed his complete concurrence with this proposal.

The president then announced that, for their services to public lighting, Dr S. English and Dr J. W. T. Walsh had been invited and had agreed to become Honorary Members of the Association. He said that the next conference would be held at Scarborough and that, in order to avoid clashing with Cricket Week, the dates would be October 3-6. The formal business completed, Mr Smith then gave his Presidential Address.

The Changing Scene

THE NEW PRESIDENT, after expressing his appreciation of the honour conferred on him, said that the theme of this year's Conference was 'The Changing Scene' in the field of public lighting. There were several aspects of the changes now taking place which would repay study. One was the tremendous growth of vehicular traffic on the roads and its influence on road engineering practice. Another was the employment of road surfaces with improved non-skid qualities but with inferior reflecting properties. To find out how street lighting could best contribute to the safe and expeditious movement of traffic during the hours of darkness, it was necessary first to analyse the driver's visual task and then to explore the possibilities offered by the improved technical facilities now available and to see how these could be employed to the best advantage in street lighting. All this could only be achieved by careful investigation and by the exchange of experience between practising public lighting engineers who were dealing day by day with the new conditions constantly arising and demanding urgent attention and prompt decision.

Mr Smith went on to point out that, side by side with these technical problems associated with the changing scene there were other matters—no less important if advances towards improved service were to be possible—associated with administration and finance, coming within the spheres of local and national government. There was also the important matter of aesthetics. Here the president paid a tribute to the work of the Council of Industrial Design, but he added that the very praiseworthy efforts of this body and those of the Royal Fine Art Commission were jeopardized, and the cause for which they stood

The scene at the opening: from left to right, E. C. Lennox (President-elect), N. C. Scragg (Town Clerk), Ald F. W. Archer (Mayor of Folkestone), F. C. Smith (President), E. Evans (Secretary), J. H. Morrison (Vice-President), R. Parker (Immediate Past President).

Mr Curzon Harper.

hindered by the ill-judged and sometimes quite irresponsible actions of the 'last ditchers'.

Concluding the first part of his address, Mr Smith said that it was gratifying to notice how Part 2 of the Code was being applied to the lighting of both old and new residential areas. Much more remained to be done, however, and improvements in the lighting of the traffic routes in an area often brought this need into greater prominence.

Folkestone and public lighting

In the second section of his address Mr Smith traced in broad outline the major developments in thought and practice which had influenced public lighting since 1927. He distinguished four periods and related these to the dates of the previous conferences of the APLE which had been held in Folkestone. First there was the period of influence of the BS Specification, published in 1927 and revised in 1931. This was followed in 1935 by the issue of the Departmental Committee's Interim Report and two years later by the Final Report. This noteworthy event in street lighting history coincided in time with the first visit of the Association to Folkestone. Then came the war, followed by the rather long period of gestation of the BS Code of Practice. It was during the interval between the appearance of the two parts of this Code that the Association visited Folkestone for the second time. Now the Code was under active review to take account of the rapid progress being made in street lighting technique and the Association was paying its third visit to Folkestone.

A summary of the technical findings in the Departmental Committee's report led Mr Smith to an appreciation of the papers presented at the 1937 meetings when authors discussed the problems of road surface brightness, new light sources and visibility. In 1955, under Mr Waldram's presidency, the Association discussed the problems connected with the rapid development of the motor industry and the vast increase in fast-moving traffic on the roads.

In his study of the period since the 1955 conference Mr Smith paid a good deal of attention to the relation between road traffic density and accident rate. It was during this period that work at the Road Research Laboratory proved much more conclusively than had been done before that good street lighting made a definite contribution to road safety. At the same time the problem was still growing in magnitude and this was proved conclusively by an extensive table giving detailed statistics for the years 1953 to 1958. These showed that while casualties as a whole had risen by 32·1 per cent during this five-year period, the increase in casualties after dark was no less than 47·8 per cent. During the same period the number of vehicles on the road increased by almost exactly 50 per cent.

After referring to the remarks of previous presidents on matters relating to the administration and financing of street lighting, Mr Smith mentioned the encouragement given by the Ministry of Transport to the formation of committees with the object of securing greater uniformity in the street lighting of adjacent areas. He interjected a warning that the term 'uniformity' should be used carefully, with a realization that the same standard of effectiveness could be produced in a variety of ways. He concluded by referring briefly to the work of the international committee on street lighting operating under the International Commission on Illumination, to the current revision of the BS Code of Practice and to the establishment by the Institution of Civil Engineers of a special group on Traffic Engineering—all signs of the urgency of the problems presented by the changing scene in public lighting.

A vote of thanks to the president for his address was proposed by Dr Walsh, seconded by Mr A. G. R. Farr and carried by acclamation.

An Engineer Looks Back

ON TUESDAY AFTERNOON delegates reassembled to hear Mr Curzon Harper present his paper which, in conformity with the general theme of the conference, he entitled 'An Engineer Surveys the Changing Scene'. Mr Harper, until recently the Borough Engineer and Surveyor of Barking, made street lighting one of his particular interests, and he was a member of the BSI committee responsible for the Code of Practice.

He started his survey with a backward glance at conditions in his own borough some thirty-five years ago. At that time Longbridge Road was a narrow lane with a water-bound macadam carriageway varying in width down to as little as 10 ft. in some places; there was a solitary electric lamp at one end and a gas lamp at the other, nearly a mile away. In 1935 an improvement scheme was carried out here and in Upney Lane and today the road had a 40-ft. carriageway, with two wide footways and grass verges bringing the total width up to about 100 ft. The lighting at first had been tungsten but in 1937 the first mercury lighting in Barking had been put in and today further improvements were being made.

Immediately after the 1914-18 war the traffic eastward from London increased at such a rate that the East Ham and Barking By-pass was constructed. It is recorded that in 1921 the old road carried just over 1,000 vehicles a day; in January 1959 a census on the by-pass showed nearly double this figure in one hour.

The changing scene in the provinces

Mr Harper then went on to give a picture of the changing scene in the Midlands. He referred in particular to the under-passes being constructed at Birmingham where, he said, it was planned that the ramps leading down to the tunnels, as well as the tunnels themselves, should have continuous lines of fluorescent fittings, the illumination at the tunnel entrance being automatically controlled according to the daylight conditions.

From the Midlands Mr Harper took his audience to East Anglia. Here one example of a change in outlook was the famous Norwich experiment (described in *Light and Lighting*, August/September 1959). Changes were also taking place in Ipswich; the old town centre was to be encircled with a modern ring road and the whole of the street lighting within this area was to be changed to the latest fluorescent type.

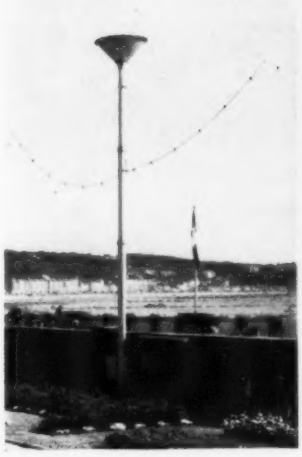
This mention of conversion caused the author to refer to an experience at Barking where, in 1954 and before some extensive modernization, the local chamber of trade was approached officially and asked for its views. These showed a preference for sodium lighting and the scheme, carried out accordingly, was testimony to the value of giving full weight to popular opinion, provided it was judiciously led.

STREET LIGHTING INSTALLATIONS

Post-top lanterns have particular advantages for the lighting of traffic routes through or near urban centres. The new Birmingham ring road is a good example of this type of traffic route and here post-top lanterns have been used to provide an intensity of illumination as high or higher than any other road in Britain. Each lantern, designed specially for the installation by the General Electric Co, employs three 400W MBF/U lamps, is 4 ft 6 in. in diameter, 18 in. deep and comprises a domed canopy and dished translucent Perspex bowl. They are mounted 30 ft high on Stewarts and Lloyds steel columns, sited opposite each other at 100 ft spacing on the outer kerbs of the road, whose 110 ft width encompasses two 38 ft carriageways large enough to take three lanes of moving traffic, a kerbside lane for unloading and a 4 ft central reservation. To facilitate access to the lamps, the bowl is held by counterbalancing weights; on being released it can then be easily pulled down, by a total distance of 18 in. The lanterns were conceived by Birmingham's Public Works Department under the direction of Sir Herbert J. Manzoni, C.B.E.

Similar conditions of heavy vehicle and pedestrian traffic using the same thoroughfare exist along promenades at seaside resorts during the holiday season. Here post-top lanterns can also be highly successful, as at Douglas, IOM, where 130 of the Revo Electric Co's Helion lanterns have been installed along the two-mile length of promenade. Each lantern houses two 250W MBF/U lamps and has been erected at 27 ft mounting height on existing steel columns. These are spaced at 100 ft intervals on both sides of the promenade at the south end and at 200 ft intervals at the north end. The installation is designed to provide a high level of illumination without detracting from the purely decorative lighting and to present an attractive day-time appearance, whilst the lanterns, of course, must be able to withstand storms and sea spray. Provision is made for reducing the level of illumination during winter months.

For relighting the town centre of Welwyn Garden City, the Urban District Council required a decorative lantern harmonizing with the lawns, gardens and trees bordering the road, giving good colour rendering, and providing a level of illumination comparable to the already well-lit approach roads. The lantern was developed from a basic form approved by the Council's consulting architect, employing a reflector optical system designed by the General Electric Co for use with 400W MBF/U lamps. More than 200 lanterns are to be installed, mounted at 25 ft on steel columns sited at 90 and 100 ft staggered spacing.



Top pictures show parts of the Birmingham inner ring road and views of the post-top high-level lighting system. Each lantern, mounted at 30 ft, houses three 400W MBF/U lamps. The bowl can be released and moved down 18 in. to give access for relamping. The centre pictures show the Revo Helion lanterns installed along Douglas promenade, whilst left is depicted the special hand-constructed lanterns installed in Welwyn Garden City town centre; they comprise brass glazing bars soldered to copper rims and carrying Chance cross-reeded glass curved to shape.

Aesthetics

Next Mr Harper turned to the vexed question of aesthetics. Expressing his intention to avoid any taint of dogmatism he began by endorsing a remark of Sir Herbert Manzoni to the effect that aesthetic appreciation was not the sole prerogative of any one professional discipline. Showing a picture of two lamp-posts of the 1913 period, he commented that they would hardly fulfil the modern desire for 'a design that is simple and restrained', yet one of them had won a Royal Academy award. One might draw the conclusion that aesthetic standards changed with the passing years.

Pursuing his theme further Mr Harper showed two pictures, one of a high voltage transmission line crossing open country, the other of the monument to the Unknown Political Prisoner erected in West Berlin. Leaving members of his audience to draw their own conclusions, Mr Harper described his own reactions to the economy and stateliness of the pylons and the graceful catenary of the power lines they carried. 'Those cables,' he said, 'can tell the initiated that the energy they carry has possibly milked the cows and helped to keep the milk clean and wholesome. The same energy may in a far distant town have floodlit some lovely building. It may have sterilized the instruments of some surgeon for a delicate operation, have spotlighted the small area of his manipulation or taken over temporarily the work of lungs too weak to function. More happily it could have illuminated a circus-ring for the laughter of children—and all this (for reasons simple to the initiated) at a price the community can afford.'

At the end of his summary of the paper, Mr Harper showed a number of slides of continental motorways with a bewildering variety of junctions and cross-overs.

Change and progress

Opening the discussion, Mr D. Clark of Norwich said progress in street lighting was so rapid that members of local authorities were often in need of advice and he suggested that the APLE should set up some kind of panel whom they could consult in such circumstances. It was pathetic to see modern fluorescent fittings mounted on old tram-poles or the like. He felt that there was a distinct trend towards cut-off lighting. Showing some slides of wall-mounted lanterns, he said that with a new building the cabling for the lamps was built into the structure.

Mr J. T. Grundy thought that progress was more rapid now than, say, before the war, and Mr E. H. Jesty of the London Electricity Board gave some figures indicating the extent of the turnover from tungsten to other light sources and the increase in the total number of lamps in his area.

E. C. Lennox speaking at the Annual Luncheon.

Mr R. J. Rennie urged that columns should be sited well away from kerbs for reasons of safety, and Mr L. R. Osgood spoke appreciatively of the designers of equipment which made maintenance so much easier than it used to be.

Mr F. H. Clinch first paid a tribute to the author for his work on behalf of needy dependants of his professional colleagues and then asked him his opinion as to the advantages of grants for public lighting.

Mr R. J. Fothergill expressed the opinion that either every local authority should have a lighting engineer or else every civil engineer should have some instruction in lighting.

Mr J. M. Waldram drew attention to the figures in the Appendix. If due allowance was made for the change in the value of money, it appeared that the yield from motor taxation had increased roughly in proportion to the rise in the number of vehicles on the road, whereas the increase in the amount of money spent on roads was very much less.

Mr E. C. Cooper of the Midlands Electricity Board wondered how one could make a valid comparison of the relative efforts made by different local authorities as far as public lighting was concerned. Would lumens per head of population be a reasonable yardstick? His colleague of the South Wales Board, Mr F. H. Pulvermacher, commented that he had worked out some figures for his own area and had found that the average there was seventeen Group A lamps per thousand of population. The figures ranged from eight to twenty-five and it was noticeable that in places where the population was below 100,000 or above 250,000 the number was below the average; in areas with intermediate populations the average was exceeded.

In his reply Mr Harper dealt with some of the points raised; others, he said, were discussed in papers to be presented at later meetings. Looking to the future he made two cogent remarks. Any mounting height greater than 35 ft. would, in his opinion, create immense difficulties as regards maintenance. Then he went on to remind his audience that what seemed mere fantasy a year ago could often be seen to be a practical possibility today and he concluded with a reference to the electronic control of vehicles as an example of what now seemed fanciful but might some day become a reality.

Mr J. H. Morrison, the new vice-president, proposed a vote of thanks to the author which was carried by acclamation.

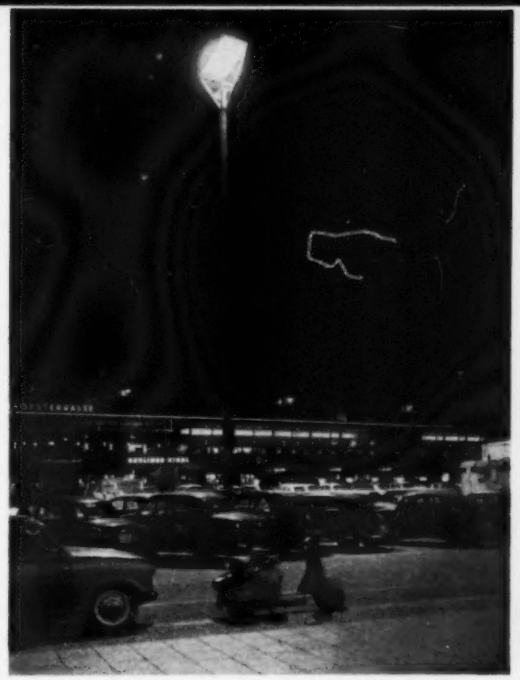
A Brains Trust for Public Lighting

AN HOUR ON WEDNESDAY MORNING was set aside for what was described in the programme as 'a short free discussion on matters relating to street lighting'. The platform party assembled to supply answers to questions from the floor were C. C. Smith, G. Grime, N. Boydell, Granville Berry and W. Robinson, with the president in the chair acting as 'question master'. The attendance was not as great as that on the first day, but questions were forthcoming without any delay.

The first was from Ald. Ireland of Brighton who asked why it was that improvements in street lighting attracted no grant and what could be done to rectify the matter. This gave Mr Berry a splendid opportunity to develop a favourite theme and he waxed eloquent on the iniquity of the present state of affairs where, although trunk roads belonged to the Ministry, if they were lighted the local authority had to pay half the cost. As far as all classified roads were concerned, he said, lighting was the only road improvement which did not attract a grant. He did not suggest a remedy but both Mr Smith and Mr Robinson pointed out that the Association had done all it could and had even sent a deputation to the Ministry, but without result.

Mr L. R. Osgood's question referred to a completely out-of-date and inadequate lighting system.

STREET LIGHTING INSTALLATIONS



On the right is seen the 65 kW xenon lamp installation outside the Berlin zoo station; mounting height is just over 85 ft and illumination 55 lm/ft² at the base of the column. Immediately below is depicted the new lighting outside the main rail terminus in Rome; it is the most powerful street lighting in the world, employing in the one lantern a 75 kW xenon lamp and four 400W MBF/U lamps. The bottom picture shows the Munich high-power installation in which 7 ft diameter lanterns house six MBF/U lamps totalling 1800W.

High-power xenon lamps are gaining popularity on the continent for public lighting, notably the lighting of large areas. One of the earliest uses of xenon lamps in this way was at Munich, where a lantern housing three 20 kW lamps was mounted 100 ft above ground level. In May of this year, Berlin followed with a lantern using one 65 kW xenon lamp, installed at a height of about 85 ft in the approach to the zoo station, giving a level of illumination of 55 lm/ft² below the column and 2·8 lm/ft² 45 yards distant. This has since been exceeded in Rome, where, in connection with the Olympic Games, a lantern housing a 75 kW xenon lamp and four 400W MBF/U lamps has been erected in the approach to the terminus station there. Mounting height is just under 100 ft. The level of illumination at the base of the column is 42 lm/ft² and at 150 ft distant from the base, 4·5 lm/ft² approximately. The length of the lamp is 9 ft 4½ in., its diameter just over 2 in., and its light output 2½ million lumens. The lantern is rectangular in shape, 16 ft long, 5 ft wide and about 11 ft high overall.

Munich has again excited attention in this growing sphere of high-power street lighting by an installation in the thoroughfare fronting the railway station, although this time using conventional light sources. Post-top lanterns have been erected at 45 ft mounting heights, each lantern housing three 400W and three 200W lamps, all type MBF/U, and giving a total flux of 126,000 lm. The lantern is 7 ft in diameter and its enclosure is of opalescent acrylic sheet (plexiglass), split horizontally, so that the upper portion (which comprises reflector-canopy and half the bowl) may be raised to give access to the lamps. Despite its size, installation of the lantern is said to be relatively simple.

Installations (continued)

Apart from its xenon lamp, Rome also has new high-power installations for the roads leading to the Olympic village. Here post-top lanterns have been employed housing three MBF/U lamps, each of 1,000W. The lanterns have a simple inverted-bowl canopy below which are fitted a number of concentric rings to prevent direct view of the lamps. They are mounted at a height of 55 ft on steel columns placed at between 65 and 80 ft intervals.

In contrast to these high-level, high-power installations are two 'low-level' installations of fluorescent lamps mounted at handrail height at the road sides. One of these is again at Rome, where the roads carried on a viaduct over the Olympic village are lighted by 3,000 fluorescent lamps of 15W rating housed in the parapet of the fly-over. Each lamp is fitted with special reflectors and axial and transverse screens.

The second installation is at Stuttgart, where 65W fluorescent lamps have been mounted in the upper edge of the barriers flanking a new urban through-way, the Paulinenstrasse. This road is a motorway without intersections designed to enable traffic to travel at high speed direct to the centre of the city; it is constructed at heights of 16 to 26 ft above the existing road system. In view of the high traffic speed and of the need to maintain conditions of safety at all times, good street lighting has been regarded as essential; the barriers along the edge of the roads provide a suitable mounting. The lighting gives an average vertical level of illumination of 13 lm/ft^2.

1, the high-power installation in the approach roads to the Rome Olympic village, and 2, a view of the lantern used, showing the 1,000W MBF/U lamps and shade rings. 3, bird's eye view of the new viaducts spanning the Olympic village and 4, the night-time appearance of the roads when travelling over them. 5, another 'low-level' installation, this time in Stuttgart, provided on the new high-level urban motorway leading into the centre of the city.

He asked whether the local authority should be told bluntly that it ought to be scrapped, or advised that a programme of improvements would have to be undertaken. The answer was that the authority should be told the plain facts and then left to decide whether to make a complete change financed by a loan, or put in hand a programme extending over five to ten years, to be paid for out of revenue.

Mr Fothergill asked whether the money available for improvement should be concentrated on raising one section of the lighting to a high standard, leaving the rest untouched, or be spent on smaller improvements to a number of sections. Mr Smith's reply was that with Group A lighting any improvement should be to a satisfactory standard but he warned of possible jealousy between the different areas in a large authority.

A question as to the advisability of periodical tests of all street lighting installations more than ten years old (on the analogy of the test for motorcars) led to inconclusive replies from the platform.

Mr L. A. Doxey asked whether motorways should be lighted and, if so, what kind of lighting should be used. This led to lengthy answers from the panel. Mr Grime said that driving would be more comfortable if there were lighting which did away with the necessity for headlights. He said that if lighting were installed the columns should be as far as possible from the carriageways so that they were less likely to be struck by a car leaving the roadway in an emergency. Mr Smith and Mr Boydell agreed that the lighting of motorways was bound to come and Mr Berry said that lighting, costing about £4,000 per mile, would enable full-time use to be made of a road costing some £250,000 per mile to construct. He said that some experiments should be begun immediately over a length of at least fifteen miles.

Mr C. S. Bayliffe, pointing out that in interior lighting design account was taken of the reflection factors of the surfaces involved, asked why no such procedure was followed in the Code of Practice. In reply, Mr Grime said that the Code was based on the characteristics of commonly used road materials and he referred to a discussion of the matter in Mr Waldram's paper. In his opinion, with modern road surfaces the high-angle-beam distribution should be discarded.

The final question came from Cllr E. K. Eckersley who said that a long road often passed through areas with quite different characteristics as regards backgrounds and other features. Should a uniform system of lighting be used throughout or should the aim be a uniform degree of effectiveness? The answer was that the latter was all-important. Mr Boydell added that it had been found useful to change the colour of the light, e.g. from sodium to mercury, to warn the motorist of a hazard, such as cross-roads.

There can be no doubt that this innovation was a marked success. The conference is attended by many of those responsible for street lighting as elected members of local authorities. The questions which confront them are often not appropriate for discussion in a technical paper. No doubt many such questions have in past years been asked and answered 'in after-dinner talk, across the walnuts and the wine', but here was an opportunity to obtain from one of the senior members of the Association an answer based not only on his knowledge of the subject but on long years of practical experience. Small wonder, then, that there was a demand that this item on the programme should be repeated and, if possible, extended at future conferences.

Annual Luncheon

TO FOLLOW the innovation came a long-established event in the Conference programme, the Association's popular Annual Luncheon. In proposing 'The Corporation of Folkestone and The Guests', Mr E. C. Lennox acknowledged the Borough's welcoming gesture of their floral replica of the Association's badge. The Mayor made a brief reply, referring to his link with the president through the medium of the gas industry.

In the unavoidable absence of Mr John Hay, MP, Parliamentary Secretary, Ministry of Transport, the toast to the Association was proposed by Mr J. F. A. Baker, CB, the Ministry's Chief Engineer. To most of his audience, motorway lighting was probably the subject of greatest importance and his comment that experience of one year's operation of M1 gave no reason to change the present policy of not lighting rural motorways or their junctions except the termini was hardly unexpected. On the other hand, his rider that lighting engineers would be well advised to look into the problems of lighting motorways in the coming years seemed to indicate a significant change in emphasis. He also touched on the value of the Association in helping to promote technical liaison between manufacturers and users in applying the results of research and on the improved aesthetic design of streetlighting columns.

The president, in reply, said that he and others in the industry saw the speed with which the factors influencing the changing scene were themselves changing as demanding a sense of urgency, but it seemed difficult to make government departments and local authorities view the situation in the same light.

Road Surfaces and Streetlighting

CERTAINLY THE LONGEST PAPER and probably that making most demands on the audience was Mr Waldram's, entitled 'Surfaces, Seeing and Driving: Some Recent Studies', delivered on Thursday morning. The first part was easy enough to follow. For many years, said the author, streetlighting practice in this country had been founded on the conception of silhouette vision of objects on the roadway, the background being the road surface made bright by the enhanced reflection of light at nearly grazing incidence. On the Continent, however, the cut-off system has been developed, with a light distribution showing a peak at about 70° and a sharp cut-off at about 80°. This system required a shorter spacing than the other, with sources in a single row, as far as possible. Its great advantage was the reduction of glare. There was also a system intermediate between these two in its characteristics.

A great mileage of good and economical lighting in this country has been designed on the first of the three systems but it was very dependent on the reflection characteristics of the road surface, as shown by the effect of a shower of rain. Since the war a great deal of work had been done on the non-skid properties of road surfaces and as a result modern roads tended to be much less directional in their reflecting characteristics. In consequence the streetlighting

J. F. A. Baker proposing 'The Association'.

lantern with a distribution in which the peak was at about 86° lost many of its advantages. The road surface, in fact, provided a cut-off and unless the lighting equipment was also limited in its emission at angles near the horizontal, serious glare would result.

Mr Waldram's conclusion was that the high-angle-beam distribution which had served so well for many years would now have to be largely replaced by something approximating to a medium-angle-beam distribution with a peak at about 75°.

The same considerations led to the conclusion that the spacing-height ratio would have to be reduced and a limit would have to be placed on the width-height ratio. Whereas the spacing-height ratio permitted by the present Code was 4·8 to 5, modern road surfaces called for values of 4 or less. While this reduction could be achieved by adopting a shorter spacing, there were good arguments for increasing the mounting height instead. One was that the width-height ratio was reduced at the same time. More light would be required and the design of the lantern as regards light distribution might be more critical.

The visual psychology of driving

In the second part of his paper Mr Waldram described a number of recent researches on driving. Experienced observers drove in all sorts of traffic and weather conditions, and over different kinds of road surfaces and recorded their visual reactions on a tape. Later, films were made in synchronism with the recordings. This work was done mostly on a figure-of-eight course about twelve miles long and lighted to good modern standards. Then an investigation of drivers' eye movements was made. In this work the observers viewed a film taken from a moving vehicle at night and their eye movements were recorded electrically.

Some very interesting conclusions were arrived at as a result of this work. On a clear road with no other traffic, all the information required by the driver was the run of the road. Fixation was slightly to the off-side and a few hundred feet ahead, the car being steered by the centre-line of the road and by the 'streamer effect' of the kerbs which were not fixated.

With traffic present, matters were quite different. It was as if the driver were stationary but in control of the lateral position of his vehicle while two streams of traffic passed him, one on the right and the other on the left. The former approached him at twice his actual speed, the latter (really stationary or slow-moving vehicles) at his own real speed. The driver's task was to manoeuvre his vehicle so as to keep within the gaps between these two streams.

An interesting and most important observation was that a driver could not fixate everything of importance; much significant information was received by peripheral vision at a low level of detail. However, if this undetailed information indicated at any time a condition which might require action, the driver was alerted and he immediately fixated, and here the importance of streetlighting became evident. So long as the driver was satisfied that nothing calling for his attention was indicated by the peripheral stream of information he ignored it. If, however, he was not certain, he had to fixate until he could determine whether it was important or not. Bad lighting, by causing this element of doubt to arise unnecessarily often, made great visual demands on the driver which could be avoided.

Mr J. M. Waldram.

It has often been contended that extra lighting is required where traffic is especially dense but the author disagreed. If the lighting was well designed, he said, so that a vehicle could be seen clearly and accurately in any position, twenty vehicles could be seen as well as one. Another contention, viz. that in dense traffic nothing could be seen but the back of the vehicle in front, was based on faulty observation. When the dense traffic was brought to a halt or to a crawl there was no visual problem, but when it was moving the driver's attention was concentrated on looking past the vehicles immediately ahead and at the inadequate gap, so as to anticipate future movements.

Mr Waldram then went on to describe some investigations on daylight vision. In general, contrasts were good but near lighting-up time the adaptation of the eye was approaching its limit and contrasts were apparently much reduced. They were, in fact, inferior to those under good streetlighting conditions although these, in their turn, were much inferior to the contrasts under full daylight. It might be that a considerably higher level of streetlighting would give much better seeing, but there was no certain evidence on the matter, and drivers could evidently work well with quite low contrasts. The author ended his paper with a warning against over-hasty conclusions, pointing out that much had been learnt recently, although the subject had been studied for at least twenty-five years.

In the course of presenting his paper Mr Waldram showed a series of short films. Several of these were of what the driver saw while making his way along the road by day and by night and the accompanying sound track gave his comments on situations as they arose. The last film was a record of the observer's eye movements as he viewed the film taken by the Road Research Laboratory from a car driven at night; a spot of light on the picture showed the position of his fixation point at any instant.

The driver's needs

The discussion was opened by Mr D. R. Greig of the Automobile Association who described some of the views of drivers with regard to streetlighting. He stressed the need for continuity and commended the use of a higher standard of lighting in a side road at or near its junction with a traffic route. He said that in pedestrian crossings the white stripes were often more shiny than the dark ones; the use of spotlights to make crossing pedestrians more easily visible was very helpful.

M. A. Boereboom of Brussels spoke highly of the author's work and made a number of comments on the paper. In particular he expressed his pleasure at noticing that British practice was tending towards that on the Continent as regards the light distribution and the spacing-height ratio. He felt that Continental practice might move in the direction of using a medium cut-off. Mentioning that an extensive programme for the lighting of many miles of main roads in Belgium had just been approved, he said that the source would be the 200W sodium lamp mounted at 10 metres, with an average spacing of 30 metres.

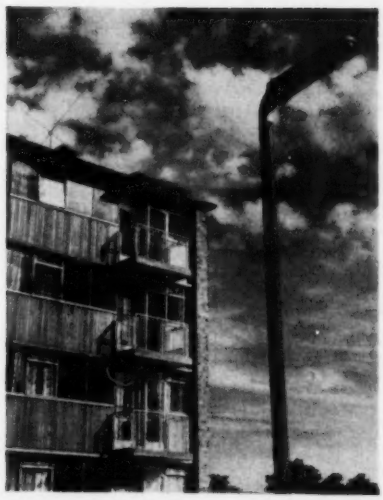
Mr H. R. Ruff endorsed all that the author had said about the importance of the road surface. It was now quite possible to calculate the results obtainable with a lantern of known light distribution on a

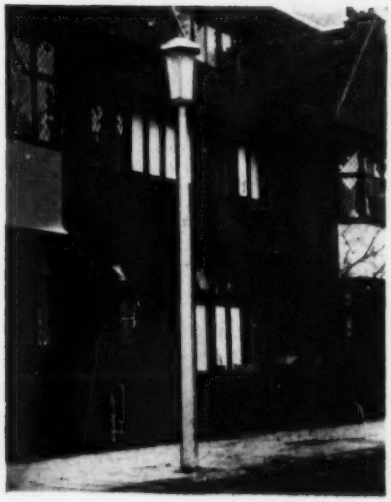
STREET LIGHTING INSTALLATIONS

With more and more of the country's traffic routes being lit to post-war standards, it has been possible, in the last few years, for local authorities to turn increasing attention to the lighting of side roads, which usually involves either converting an existing gas installation or providing new equipment in a housing scheme. Conversion implies that the buildings bordering the roads are at least as old as the existing gas installation, and many are, of course, considerably older; the new equipment must therefore be chosen to minimize aesthetic discord with the surrounding architecture. Lighting new roads imposes less severe problems, since the aesthetic style of both buildings and lighting equipment are not so likely to be out of sympathy.

In Bromley, Kent, the authority is planning in the next four years to convert remaining side streets from gas, but they also have the lighting of new roads to prepare as well. The Bromley lantern was specially designed by Revo to meet their requirements for a post-top lantern of modern design, giving good light control with a horizontal burning 60W sodium lamp and mounted at 15 ft on GEC steel columns. Its clean lines make it suitable for both new and existing residential areas.

The same firm were faced with a contrasting problem in the relighting of Hartlepool's side roads. For these residential districts, fluorescent lighting was decided on, using lanterns with two 2 ft, 40W tubes. In most of the roads, Revo's C15116 conical post-top lantern was employed, mounted either on aluminium columns in hammered grey finish, or on tubular steel columns having identical appearance or on fluted tubular steel columns, all at mounting height of 14 ft. In the neighbourhood of St Hilda's church, the more decorative Eastbourne lantern was chosen, with more ornamental 13 ft 6 in. tubular cast iron columns, whilst for the town hall area and promenade Festival post-top lanterns were installed with four 4 ft, 40W lamps and decorative steel columns. Other parts of the town were provided with Sol-Etern side-entry lanterns mounted at an inclination of 15 deg. and a wall mounted adjustable lantern using a 5 ft, 80W tube.





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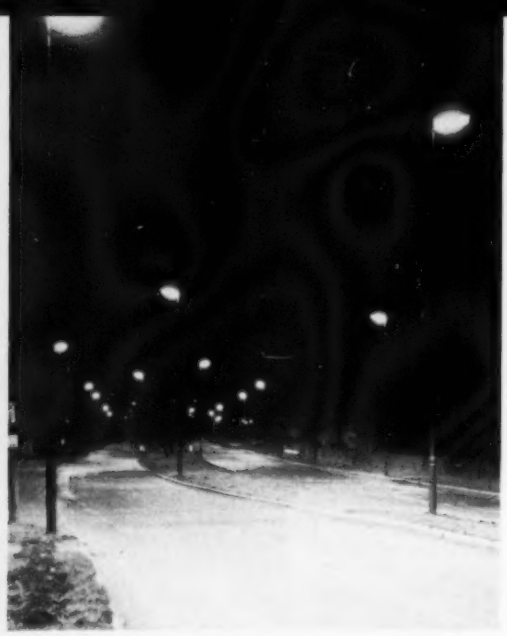
1, Revo Bromley lantern on a modern housing estate at Bromley. 2, Siemens 2 ft Crawley lantern on a group B concrete column at Alkrington housing estate. 3, side road lighting at Eindhoven, Holland, using Philips 32W circline lamps. 4, an aspect of the Maidstone relighting—2 ft Crawley lanterns on steel columns at Park Wood. 5, the Revo Eastbourne lantern for 2 ft fluorescent lamps near St Hilda's church, Hartlepool. 6, the special lantern designed by the GEC for side roads in Chelsea.



Above, two sodium lamp installations. On the left, the Puislaan dual carriageway at Eindhoven is lit from Philips fittings housing two 85W lamps mounted on columns at the sides of the road at a height of 29 ft, with opposite spacing of 85 ft; illumination on the road varies between 1 and 3 lm/ft². Lamps are increased to 140W at intersections, with columns mounted centrally. On the right is depicted part of the great north road at Gosforth Park, three miles north of Newcastle-upon-Tyne, claimed to be the first full-scale installation of 3 ft linear sodium lamps in the north of England. Bottom-entry AEI Amberline lanterns are mounted at 35 ft on Stewarts and Lloyds steel poles; lighting on each carriageway was separately planned, first by determining the column siting at intersections to ensure that they were well lit then placing other columns between junctions with spacings never more than 170 ft.

Below, aspects of the new street lighting at Maidstone: a 5 ft Kuwait lantern adapted to an existing lighting column and seen against a typical Kentish background of oasthouses; another 5 ft Kuwait lantern but in the wall-mounting version, used in a street too narrow to permit erection of columns; junction in the town centre lighted from single and twin-arm Kuwait lanterns mounted on trolleybus poles.

Installations (continued)

In some areas special architectural character demands individual treatment, as at Chelsea, where the GEC designed a new post-top lantern to the Council's requirements for the relighting of the Borough's side roads. It houses two 2 ft, 40W fluorescent lamps, together with a reflector-refractor optical system, in a hexagonal body constructed in copper and brass. The lanterns are mounted on GEC octagonal tapered steel columns.

A major relighting scheme, involving both traffic routes and side roads, is in progress at Maidstone, Kent; the first phase was completed this summer as part of a five-year project costing £100,000. It involved replacing tungsten and mercury fittings on the main north-south and east-west routes at the centre of the town, on a trolley-bus route running through the council's modern Park Wood estate and on bus routes running on secondary roads near the town centre, with fluorescent lanterns taken from the Siemens-Ediswan Kuwait Unitary range; the same system will form the basis of the equipment to be used in phase 2.

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Proposing a vote of thanks to the author, Mr H. Carpenter confirmed the desirability of smaller spacing-height ratios. He expressed the opinion that, with the ever decreasing cost of light, the changes foreshadowed in the paper might be realized much sooner than anyone expected.

Trends in Technology

A PAPER WITH THIS TITLE was presented by Mr J. G. Holmes on Thursday afternoon and in it he surveyed the changing scene from the point of view of the technologist who, he said, might be an engineer, a designer, an applied scientist or a practitioner in some form of industrial activity. The technologist stood between the scientist who studied the fundamentals of his subject and the technician who had the ability to carry out a specific job.

Dividing his subject into six sections, Mr Holmes dealt first with the light source. The tungsten filament lamp was still the basic light source and it was still undergoing changes, although these were not spectacular. Some of these changes, such as the improvement in capping cements, were undoubtedly advantageous but the author seemed less certain about others, particularly the reduction in bulb sizes; the consequently higher temperatures reached might well result in rapid deterioration of the insulation of the supply cable, whether this was rubber or some form of plastic. It was not unnatural, too, that he should express the yearnings of the fittings maker for some greater stability in the situation. He urged that in the larger ratings, sizes should change with alternate lamps so that, for example, the 150W lamp should be the same size as the 200W, and so again for the 300W and the 500W ratings.

In contrast to filament lamps, sodium lamps seemed to be getting larger; the call for higher efficiency and the need for accurate control of the light both led to the design of long tubular lamps. Fluorescent lamps were still making progress but the bulb type, although becoming more popular, was not yet fully exploited by the public lighting engineer. He had accepted lanterns 6 ft long to house three tubular lamps giving 15,000 lumens; might not one suggest a lantern of comparable size for a 1,000W bulb fluorescent lamp giving 40,000 lumens?

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Plastics were now widely used for refractors but the public lighting engineer, with glass in mind, made severe demands, particularly as regards durability and resistance to deterioration by the atmosphere. Some of the newer materials, such as polypropylene or the polycarbonates might prove useful, although they were not water-white or perfectly clear.

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Lanterns and columns

The next two sections of the paper were concerned with lantern design and construction. The advent of the tubular fluorescent lamp, which was optically very unmanageable, had led to a greater tolerance on the control of the light coming from the lantern. Now there seemed to be a trend towards cut-off lighting and this would probably mean a return to more careful optical control, at any rate in the vertical plane and in the neighbourhood of 80°. Mr Holmes spoke with regret of the lack of control of the output efficiency of lanterns and expressed the view that, unless such a control was imposed, there was a risk that the continuing improvements in light sources might be nullified by bad lantern performance.

In lantern construction, cast iron was being replaced by aluminium alloys which, although more expensive, had many advantages. The increasing cost of maintenance had a great influence on design and a recent publication of ELFA, 'Guidance Notes for Purchasers of Street Lanterns', dealt with this matter among others. The Notes, said Mr Holmes, were prepared to supplement BS 1788 by drawing attention to certain features of lantern construction which could not easily be included in a mandatory specification.

Recent improvements in streetlighting columns had been the outcome of advances in various fields; the results had been welcomed by those concerned with the fine arts as well as by those who had to carry out the erection. Building heights in towns and cities were increasing on all sides and they were separated by wide roads and by open spaces more than in the past. In these circumstances there might well be a demand for higher lighting columns, especially as modern buildings often did not lend themselves readily to wall mounting.

Above, two sodium lamp installations. On the left, the Puislaan dual carriageway at Eindhoven is lit from Philips fittings housing two 85W lamps mounted on columns at the sides of the road at a height of 29 ft, with opposite spacing of 85 ft; illumination on the road varies between 1 and 3 lm/ft². Lamps are increased to 140W at intersections, with columns mounted centrally. On the right is depicted part of the great north road at Gosforth Park, three miles north of Newcastle-upon-Tyne, claimed to be the first full-scale installation of 3 ft linear sodium lamps in the north of England. Bottom-entry AEI Amberline lanterns are mounted at 35 ft on Stewarts and Lloyds steel poles; lighting on each carriageway was separately planned, first by determining the column siting at intersections to ensure that they were well lit then placing other columns between junctions with spacings never more than 170 ft.

Below, aspects of the new street lighting at Maidstone: a 5 ft Kuwait lantern adapted to an existing lighting column and seen against a typical Kentish background of oasthouses; another 5 ft Kuwait lantern but in the wall-mounting version, used in a street too narrow to permit erection of columns; junction in the town centre lighted from single and twin-arm Kuwait lanterns mounted on trolleybus poles.

Installations (continued)

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Discussion

The discussion was opened by Mr D. R. Colvin who, after referring to the striking reductions which had taken place in the cost of light, regretted that the same trend was not detectable in the cost of columns. He did not favour the author's suggestion that lamp ratings should be paired as regards size, and he expressed the view that improvements in design had been more noticeable in concrete than in steel columns.

Dr H. H. Ballin stressed the importance of glare and put forward the suggestion that the general preference for sodium lighting in the past might be due to the fact that the lamps used had a comparatively low luminance. The new sodium lamps, however, were brighter and this might alter the situation. Another disadvantage of the new lamps was their length; it was this that had adversely affected the use of tubular fluorescent lamps for streetlighting. He thought that the under-running of tungsten lamps might encounter some difficulties. For instance, the standard supply voltage was now 240 whereas the maximum for lamps was no more than 250.

Mr J. Wilson of Paisley said that he was experimenting with the use of under-run colour-corrected mercury lamps of the 125W rating, a statement which seemed to result in a general raising of eyebrows. Mr L. C. Rettig urged that, in order to reduce glare, lanterns should be as large as was aesthetically acceptable.

The president joined in the discussion to remark that corrosion could be prevented in three ways. The first, removal of the corrosive agent, was not usually possible in streetlighting. The second was to choose a material resistant to the corrosive agent present. The third was to provide a protective coating, but it was essential that this should be continuous. Mr D. H. Carre followed with a description of the way in which the problem was solved in Jersey, where it was very serious. The narrowness of the streets necessitated wall-mounting, but as the buildings were mostly of granite, each back-plate had to be drilled to suit the joints between the granite blocks on which it was to be fixed. It was then cadmium plated to give the required continuous protective coating.

Mr D. Clark said that the spacing-height ratio in Norwich had been reduced two years ago to four. He added that tungsten lamps were being superseded even in Group B lighting. Mr J. F. Pickup asked for a krypton-filled tungsten lamp and suggested the use of a short length of heat resistant cable near the lampholder.

Replying to the discussion, the author first referred those interest in corrosion problems to the IES Technical Report on the subject. He then expressed his strong personal preference for a white light rather than monochromatic sodium, especially in populated areas. To critics of his 'ideal' source he emphasized its advantages. In particular, as it allowed proper optical control of the light, glare could be prevented.

In proposing a vote of thanks, Mr Granville Berry mentioned that Mr Holmes had given his paper in spite of illness from which he had, as yet, scarcely recovered and the appreciation of the audience was expressed in their enthusiastic endorsement of Mr Berry's tribute.

Public Lighting in a Changing World

THE PAPER PRESENTED at the technical meeting on Friday morning was entitled 'Progressive Changes in Public Lighting' and in it the authors, Mr T. M. Lappin and Mr H. Robertson, reviewed some of the developments now to be noticed up and down the country. Many of these had been brought about by social changes which affected the whole system of traffic highways. Major changes in road dimensions and the construction of such aids to traffic flow as fly-overs or underpasses had been necessitated by the vast increases in traffic; minor roads had to deal with conditions for which they were not designed and the demands of cities and shopping centres were becoming more and more insistent.

The fact that there was a general desire for higher levels of lighting led the authors to suggest that the number of lumens per 100 linear feet of road had ceased to be a satisfactory yardstick and they suggested lumens per unit area of road surface instead. They urged that efforts should be devoted to bringing all traffic routes up to Code standards before the general standards for ordinary traffic roads was raised. Higher standards, they said, found their proper application in 'special purpose highways' such as main traffic routes through cities or conurba-

At the exhibition: E. Evans and W. Robinson, with The Mayor, President and Vice-President discussing EDA's new booklet on their stand.

tions, with or without a speed limit, ring roads, by-passes and roads in town centres congested with vehicles and pedestrians. Modern conditions, they suggested, had caused the simple two-group classification used by the Departmental Committee and in the Code to be out-dated and they looked forward to the introduction of a third group with lighting to a higher standard than that of Group A.

Once more there was a reference to the darker road surfaces now commonly employed and the authors described some of their experiences in Dundee. The advent of the new high efficiency light sources had once more presented the public lighting engineer with the alternatives of saving on running costs or providing more light; it seemed as though the second course was generally preferred. There was, said the authors, a tendency towards greater mounting heights and they thought a third height of about 35 ft had come to stay.

The use of colour-corrected mercury lamps in built-up areas was increasing and the authors mentioned a number of localities where conversion to this type of lamp had taken place. A recent and notable installation was that in the Birmingham Inner Ring Road where the lumens per 100 linear feet exceeded 30,000. Perhaps the most spectacular advance, however, was the introduction of the 200W linear sodium lamp and the 280W integral lamp. These found their most important application in the lighting of dual carriageways and the authors listed four arrangements which could be adopted in such thoroughfares. They mentioned as examples the Glasgow-Edinburgh Road and the Coventry By-pass and Ring Road.

Aesthetics again

After a glance at the problems of lighting motorways, fly-overs and underpasses, the authors passed on to deal with the choice of equipment, particularly from the aesthetic point of view. They mentioned the work of the Council of Industrial Design and said that the Royal Fine Art Commission was able and willing to help local authorities on the selection of columns for use in particular surroundings. As an example of the value of co-operation between the Commission and the lighting authority they described the relighting of the main London-Oxford road where it passed through the picturesque village of West Wycombe. The village belonged to the National Trust who were opposed to the erection of 25-ft columns as completely out of keeping with the character of the buildings. A happy solution was found in the use of post-top and wall-mounted lanterns at a mounting height of 15 ft.

On the lighting of central areas and civic centres the authors mentioned the tendency to mounting heights of about 35 ft and the use of multi-lamp fittings housing colour-corrected mercury lamps.

The final sections of the paper were devoted to the subject of Group B roads. Much of the new lighting of these roads was being installed in housing estates where carriageway widths varied from 16 to 30 ft, sometimes with wide footways and grass verges. The authors contended that on roads where the carriageway was more than 22 ft wide, satisfactory lighting for pedestrians and motors could not be provided with a mounting height of 15 ft. They mentioned schemes where roads of this kind were lighted with 60W and 85W sodium lamps mounted at 25 ft and staggered, with a spacing of about 120 ft. The trend was to increase the level of lighting in Group B roads and the authors suggested that, while many such roads were narrow enough to be satisfactorily lighted within the provisions of the Code, it was desirable to raise the upper limit of 2,500 lumens per 100 ft, so that account could be taken of the width of the road in determining the amount of light actually to be provided.

No room for complacency

After the paper had been presented by Mr Lappin, the discussion was opened by Mr W. Robinson who threw out a challenge based on the authors' statement that 50 per cent of roads in this country were still not up to Code standards. This, he said, showed that we had no excuse for being complacent. He fully agreed that it would be better to introduce a new class for special purpose roads than to attempt to modify the recommendations for Group A so that such roads could be included. He said that there was plenty of engineering talent available to light the motorways and he concluded with a commendation of the permanent exhibition of equipment arranged on the South Bank by the Council of Industrial Design.

Dr Walsh referred to the relighting of West Wycombe and urged that personal contact between those responsible for the engineering performance and those interested in the preservation of the artistic amenities was essential. Later on in the discussion, Mr L. C. Rettig said that it was wrong to regard efficiency and aesthetic quality as alternatives; the requirements in both directions should be reconciled.

Mr J. H. Morrison claimed that the 140W sodium lamp gave little glare. He showed slides of a fitting giving blended light and used in Bolton experimentally. In this about half the 76,000 lumens were from sodium lamps.

After Mr J. Brodie had pressed the claims of the Group B thoroughfares, Mr H. Carpenter inveighed against the use of sodium lighting in housing estates, when fluorescent was just as cheap and far more pleasant. He made, once again, his plea that mounting height should be decided by the local public lighting engineer, a plea that was followed up by Mr Norman with yet another request for an intermediate mounting height for minor traffic routes. Mr Harrison went still further and advocated an intermediate class in the Code for such roads.

Mr A. W. Christie pointed out that the different siting arrangements described by the authors for dual carriageways might well call for different light distributions if dark patches on the roadway were to be avoided. He said that longitudinal dark lanes were especially dangerous, as objects could be completely lost in them. For this reason a cut-off distribution was often preferable.

Replying to the discussion, Mr Robertson supported the adoption of closer spacing wherever this was possible. He defended the use of sodium lighting in residential areas and said this was quite common practice in Scotland. The use of granite chippings to make the road surface lighter was of considerable advantage. In reply to an inquiry from Mr E. H. Jesty on the prevalence of malicious damage, he said that this was unfortunately still with us.

A vote of thanks to the authors, proposed by Mr C. C. Smith, was carried by acclamation.

Dr S. English receiving his Honorary Membership.

Dr J. W. T. Walsh after receiving his Honorary Membership.

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Type OR (—40 to + 60°C.)
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	Case Length	Cross Section	
8μF ± 10%	5½	2½ x 1⅜	OR 117384
10μF ± 10%	4½	3 x 2	OR 117336
13μF ± 10%	5⅞	3 x 2	OR 117337
15μF ± 10%	5½	3 x 2	OR 117338
18μF ± 10%	6½	3 x 2	OR 117339
20μF ± 10%	7½	3 x 2	OR 117340

Type AR (—5 to + 60°C.)
Welded Aluminium Cased, Elastomer Sealed

8μF ± 10%	4	2½ x 1⅜	AR 130043
10μF ± 10%	3	3 x 2	AR 130044
13μF ± 10%	3½	3 x 2	AR 130045
15μF ± 10%	4½	3 x 2	AR 130046
18μF ± 10%	5⅞	3 x 2	AR 130047
20μF ± 10%	5½	3 x 2	AR 130048
25μF ± 10%	6½	3 x 2	AR 130049

Type HB (—25 to + 50°C.)
Aluminium Cased, Elastomer Sealed

8μF ± 10%	2⅝	2½ x 1⅞	HB 117383
10μF ± 10%	3½	3 x 2	HB 117330
13μF ± 10%	3½	3 x 2	HB 117331
15μF ± 10%	4½	3 x 2	HB 117332
18μF ± 10%	4½	3 x 2	HB 117333
20μF ± 10%	5⅞	3 x 2	HB 117334
25μF ± 10%	6½	3 x 2	HB 117335

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Street lighting equipment on show at Folkestone

Lamps, lanterns, columns and other street lighting equipment displayed at the APLE Exhibition featured new ideas for sodium lamps.

The APLE President and Mayor of Folkestone inspect new Phosco lantern.

THIS YEAR'S APLE EXHIBITION seemed to have an air of expectation rather than of fulfilment. The industry is perforce marking time until the way ahead is settled for another decade. It is only natural, therefore, that the exhibitors seemed to show greater forwardness in their thinking than in their exhibits.

Lamps

This attitude was particularly true of the lamp displays, which featured high-power sodium lamps in a plethora of variations. Whilst the 200W rating has undoubtedly caught on, lamp manufacturers were concerned to show that other sizes are being actively studied in endeavouring to anticipate, or guide perhaps, future streetlighting requirements.

Examples of this are the experimental 4 ft linear sodium lamps, rated at about 200-250W and for which a luminous efficiency of 125 lm/W is indicated. These were shown by both GEC and the AEI Lamp and Lighting Co. There was also a long U-tube sodium lamp to show that the linear source has by no means ousted the more familiar form. With larger lamps having light outputs from 40,000 to 50,000 lumens also being mooted as a future possibility, the time seems ripe for a technical-commercial get-together such as was easier to achieve before, alas, ELMA became a naughty word.

Of specific lamp developments, Philips were featuring a 200W sodium lamp of familiar dimpled U-tube construction for which they claim an efficiency of 100 lm/W average through life. Emphasis here was on the use of their high-output lamps in standard fittings and with standard accessories. The GEC offered their 'entwined limb' 280W version on the one hand, and surely gained a novelty prize on the other with a reflector version of the integral 140W rating, designed to make the best use of obsolescent lanterns during this interim period. A sound idea within the scope allocated to it.

The 'winds of change' in sodium lighting should not be allowed to divert attention from mercury vapour lamps. Emphasis on improved colour rendering was even more marked, and Philips featured this delightfully by trundling model buses endlessly through a comparator unit in three zones, the first lit by an early MA/V lamp, the second by an MB/U lamp by which the MA/V has been replaced, and the third by an MBF/U lamp. The GEC seem to have a passion for 'reflectorized' lamps, since their mercury section highlighted the reflector fluorescent version introduced late last year, and having an internally silvered bulb to give control of light distribution, making it suitable for special applications involving minimum protection.

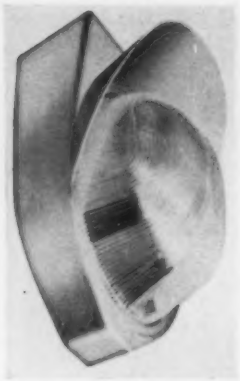
Like the poor, tungsten lamps are still with us. They still light by far the greatest mileage of our roads and their demise is by no means as near as some are forecasting, but can anyone sort out for us the answer to the single-coil versus coiled-coil argument which has suddenly appeared out of the blue?

Lanterns

New lanterns were there in plenty, both functional and decorative. The GEC pulled no less than ten out of the bag, of which three support the trend to greater mounting height and longer spacing. One of these is, not surprisingly, for the 200W linear sodium lamp (page 327); the other two are for mercury lamps. Of these, one is a decorative lantern using three 250W MBF/U lamps; the other is an interesting cut-off unit for 250 or 400W MBF/U lamps. Wider spacing in this case relates presumably to the currently recommended *cut-off* spacing. For area lighting, they showed another new mercury lantern using 250 or 400W lamps and a post-top decorative fitting employing four 5 ft fluorescent tubes. Their remaining five newcomers were all for side road lighting. One, utilizing a horizontally burning mercury or tungsten lamp employs a shallow dish refractor with horizontal prisms to give a compact unit (page 324). Another has been designed to accommodate a variety of optical systems. The last three are fluorescent fittings, for two 40W tubes, four 3 ft tubes and one vertical 80W tube, respectively.

The AEI Group in charming confusion, showed on one stand the products of their Lamp and Lighting Company and on another the products of the old Siemens-Ediswan organization, now incorporated, seemingly inappropriately, in their Radio and Electronic Components Division which is administered under the aegis of AEI (Woolwich) Ltd.

1



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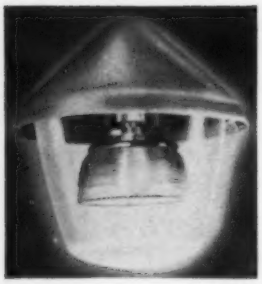

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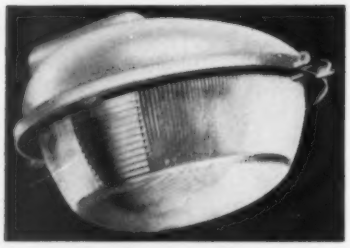


1. *Holophane's new Hastings wall-mounting lantern for 250W or 400W MBF lamps.*

2. *The Atlas Beta IV lantern now modified by the addition of an enclosing bowl.*

3. *The Georgian style lantern designed by Falks for installation in Shrewsbury.*

4. *Revo Electric Company's Eastbourne lantern, designed for group B lighting using a 250W MBF/U lamp.*

5. *The new Holophane Bi-Way bowl for 250W or 400W MBF/U lamps, shown fitted in a side-entry canopy.*

6. *The new GEC side-road lantern for tungsten or mercury lamps with shallow dish refractor and horizontal prisms.*

The AEI Lamp and Lighting Company introduced two variants on the original Amberline lantern for their 200W linear sodium lamp. One is a side-entry lantern (the original was bottom entry) of more compact design (page 326); its refractor optical system gives a non-cut-off medium angle beam with a sharp run back commencing at about 77 deg. The other is a cut-off lantern, also for side entry, employing a reflector optical system housed in a grey 'Perspex' canopy enclosed on its underside by a flat sheet of clear 'Perspex'.

The other AEI branch (Siemens-Ediswan) also emphasized side-entry mounting in the new designs of lanterns shown. Most of these newcomers form part of the Siemens-Ediswan Unitary system which has its origin in a single design of fluorescent lanterns—the 5 ft Kuwait. This was later joined by lanterns of similar style in 4 ft, 3 ft and 2 ft sizes: the Court, Carpenter and Crawley for fluorescent lamps and the Osprey, externally identical to the Carpenter, for 3 ft linear sodium lamps. The original range of single and twin-head lanterns for pole, wall and catenary-wire mounting has now been extended, first, by four-arm heads for the Kuwait and Court lanterns (page 323), suitable for central mounting on dual carriageways and for parade lighting, and, second, by side-entry heads for the Carpenter, Osprey and Crawley lanterns (pages 323, 325). A further variation is provided in the Osprey, which is available with and without provision for control gear in the body. In all, the system now presents a choice of 250 different lanterns from seventy-five basic components. The other Siemens-Ediswan lanterns for 3 ft sodium lamps, their Oline range, were extended by a new cut-off version (page 325).

Atlas Lighting presented with justifiable pride their Design Centre Award winners, the Gamma Four post-top lanterns for two 250W or 400W MBF/U and the Gamma Five post-top for 80 or 125W MBF/U. The Gamma series has been further extended by a new Gamma Three lantern for one 250W or 400W MBF/U lamp, designed for intermediate mounting. Their Alpha series has also been extended, now embracing the Alpha Five (page 326) for the 200W linear sodium lamp. This lantern attracted attention by its shallowness (it is only 7 in deep) and, technically, by a sharp run back in the distribution above peak, achieved by a reflector-refractor optical system giving almost complete cut-off above the horizontal. It comprises merely an aluminium canopy with an internal aluminium support casting carrying the reflectors and a bowl of acrylic sheet. Other newcomers included the Beta Four enclosed lantern for Group B lighting and a new weatherproof 150W low voltage spotlighting fitting.

Another firm to introduce quite a number of new lanterns was the Engineering and Lighting Equipment Co Ltd. For sodium lamps they showed a Mark X version in their Golden Ray series (page 326), using a 45 or 60W lamp and refractor optical system combined in lightweight housing for the simplest form of Group B lighting. It contrasts with their Golden Ray 200 and Golden Ray 280 lanterns, introduced earlier this year. New 'Eleco' lanterns for mercury lighting include the Silver Ray Junior, for 80 or 125W MBF/U lamps, and whose slim proportions should make this particularly attractive for Group B installations. Modified marks of both Ware and Baldock Group B lanterns (page 324) were also introduced, together with the Eleco-way Slim post-top lantern, a modification of the Eleco-way with increased height and reduced bowl and canopy dimeters.

Falk Stadelman made particular feature of their 'period style' lantern designed, in both Group A and Group B versions, specially for use in Shrewsbury where the authority required a lantern with an aesthetic style in keeping with the city's historic architecture. The lantern is octagonal, being glazed with alternately broad and narrow sheets of dimpled glass. It accommodates a 750W g.l.s. filament lamp, used in conjunction with a dome type reflector. Their associate company Ionlite had an interesting exhibit in a floodlighting lantern for cold-cathode tubes, fabricated in coloured, resin-bonded glass fibre, making it possible to combine a pleasing decorative appearance with outstanding resistance to the most severe atmosphere conditions.

From Holophane came a new wall-

mounting lantern of smart appearance, employing one of their now well-known series of oval bowl refractors to provide two-way non-axial light distribution for mounting heights of 25 to 30 ft. It is designed for 250 or 400W MBF/U lamps. This was accompanied by two new glasses in their Bi-way range of bowl refractors. The designs have been developed to provide improved performance with MBF/U or tungsten filament lamps, achieving a higher peak intensity in the main beams and reducing the amount of light emitted directly across the road.

New designs from Phosco included two sodium lanterns, the SO 200 and SO 280 Universal (see page 327), the former for 200W linear sodium lamps, the latter also for these lamps or the 280W rating. Both lanterns are made with a hood either of self-coloured glass fibre or cast aluminium, whilst refractor or reflector systems are available with each. They also showed a new ornamental wall mounting lantern recently installed in the Worcester Cathedral Precinct; it comprises a half-cylinder of opal glass, mounted in a rectangular frame with wrought-iron scroll work above and below and enclosing two, vertically mounted 2 ft, 40W fluorescent lamps.

The Revo Electric Co also had a design for the 200W sodium linear lamp—their Hyperion lantern (see page 328) for side-entry mounting at 25 ft. It has a silicon aluminium alloy body and 'Perspex' bowl attached by a stainless steel hinge and fastener. A refractor optical system is employed, although a satin finished anodized aluminium reflector can be provided if required. In the Horizon Major (see page 325) they have a new side-entry version of their original Horizon lantern, designed for Group A lighting and utilizing 250 or 400W mercury discharge lamps in a refractor optical system. A new Group B design (see page 328) was shown, available for top-entry or side-entry mounting, with or without enclosing bowl. Post-top fittings included the Bromley (see page 327), a Group B lantern for 45 or 60W SO/H lamps, with a Perspex bowl, having refractor plates cemented on each side and opal ends. There was also the Helion post-top for two or three 250 or 400W MBF/U lamps and 25 ft mounting height and the more decorative Eastbourne glazed with eight opalescent panels which enclose a MBF/U lamp: its frame is of brass, its canopy of copper, finial and base are cast iron.

Other notable equipment included Benjamin Electric's Model-Fifty Duoflex overhead floodlighting unit, which was demonstrated in versions for pole-top and pole clamp mounting and also for use with London Electric Firm's raising and lowering gear. Victor Product's display differed in that emphasis was given to the lighting effect of their miniature fluorescent bulkhead fitting, rather than to the fitting itself.

Columns

The column of columns stretching from the Leas Cliff Hall along the edge of the gardens could hardly hope to escape the doggy chestnut; this year it took the form of a press picture of a small dog surveying the scene in an obvious agony of indecision. Almost equally difficult, faced with such bewildering variety, must be the decision for lighting authorities, although the physical arrangement this year was much more helpful in permitting critical judgment of each design, despite the inevitable distraction from its neighbours by their very nearness. The observer was able more readily to separate for himself designs which attracted from those which did not. A concrete replica of a traditional cast iron column of the sort almost always associated with the four sided gas lanterns inevitably came within the latter category; no doubt a ladder arm would have been included if concrete had anything in common with cast iron other than castability.

One of the most interesting designs, if not necessarily new, was the Dalbukirk tri-tubular Group B column with resin-bonded glass fibre base. Another notable design, technically, was the 'Jacknife' column which Abacus introduced. It is hinged at just above its centre so that, by means of a worm and wheel mechanism in the base driven by a standard ¼ in. portable electric drill plugged into the lantern supply, the upper half of the column may be swung downwards, to bring the lantern into reach from the ground for cleaning and relamping. To reverse the mechanism, the worm is switched to opposite hand and the drill applied to its other end. Sideways operation can be arranged, to permit its use on columns mounted in central reservations.

Columns, in both concrete and steel, for 30 and 35 ft mounting height, were well in evidence. Concrete Utilities introduced a new column design, to which metal brackets are added to give either mounting height whilst their existing Highway X design for 25 ft mounting height is also capable of extension by means of special brackets to

Three methods of lantern access. On the left, the 2-ton capacity HIAB speed loader, designed primarily for handling columns but now fitted with a platform to facilitate its use for maintenance. Centre, a Harbilt electric vehicle fitted with Access Equipment's Long-Limb turntable-mounted extending ladder, whose angle of inclination can be adjusted to give reach over obstructions or to lanterns mounted back from the kerb. An alternative from the same firm is shown right in their Tallescope telescopic work platform with individually adjustable legs to cater for uneven or sloping surfaces.

the new heights. They also had a Group B design claimed to be the slimmest yet.

Poles Ltd showing their Adastral nesting range of columns, now, of course, extended to cater for 30 and 35 ft mounting heights, made particular reference to the new edition of BS 1850, whose scope now covers columns made from sheet and plate steel as well as from tubular steel. Stanton Ironworks showed ten of their prestressed concrete columns; recently introduced bracket arms for their No. 11 range appears to confirm that the intermediate mounting height is gaining acceptance. Stewarts and Lloyds offered a variety of tubular steel designs up to 35 ft mounting height, all incorporating their new plain slip-in doors; their associate company, Tubewrights, had a floodlighting tower dominating the entrance to the exhibition.

It was pleasing to see that the marriage of columns and lanterns seems to be taken for granted. This trend is, of course, stimulated by the decision of traditionally lantern firms to undertake column manufacture. GEC showed, for the first time, their Group A and Group B columns now made in aluminium; they offer advantage of reduced weight over their steel counterparts, with which they are identical in appearance. AEI also had aluminium columns—their Leader design.

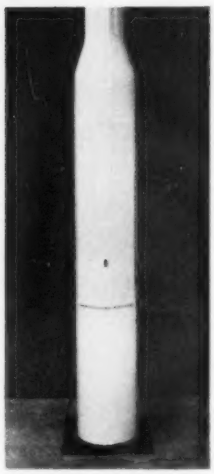
Wagons and Ladders

There was the usual display of tower wagons and similar mobile equipment. Simon Engineering (Midlands) Ltd were showing two of their well known hydraulically operated platforms; one was displayed on the latest Dennis vehicle for street lighting servicing, incorporating a roomy workshop integral with the cab. Another hydraulically operated platform was featured by George Cohen, Son & Co, in their HIAB speed loader. This was developed originally for handling columns, both for on-loading at the yard and for off-loading on site and lifting during erection. It is now suitable for maintenance by the attachment of a simple platform to the end of a boom.

Other designs on show included two models by Access Equipment Ltd; one of these is the Tallescope telescopic work platform and the other the Long-Limb turntable-mounted extending ladder, which is particularly suitable for use where access is restricted because of a parked car, or the column is sited at the back of the pavement. Another design giving access under these conditions was the Slingsby Sky Ladder, a turntable mounted unit which can be operated by one man.

Accessories Displays

In the accessories displays, new capacitors for discharge lighting were prominent. A. H. Hunt had two ranges with specially processed impregnants, based on their existing products for fluorescent lighting applications, but permitting a marked reduction in dimensions. The Telephone Manufacturing Co exhibited a new capacitor range in which reduced dimensions were also featured, permitted by the use, in certain types, of a high permitivity, chlorinated impregnant. Among time switches on show, changes of detail rather than substance were to be seen: Venner indicated the adoption of new white dials with improved legibility, whilst Horstmann included a new design to provide for two lighting periods in those situations where the streetlighting is extinguished at midnight and then switched on for an hour or so before dawn during winter months.

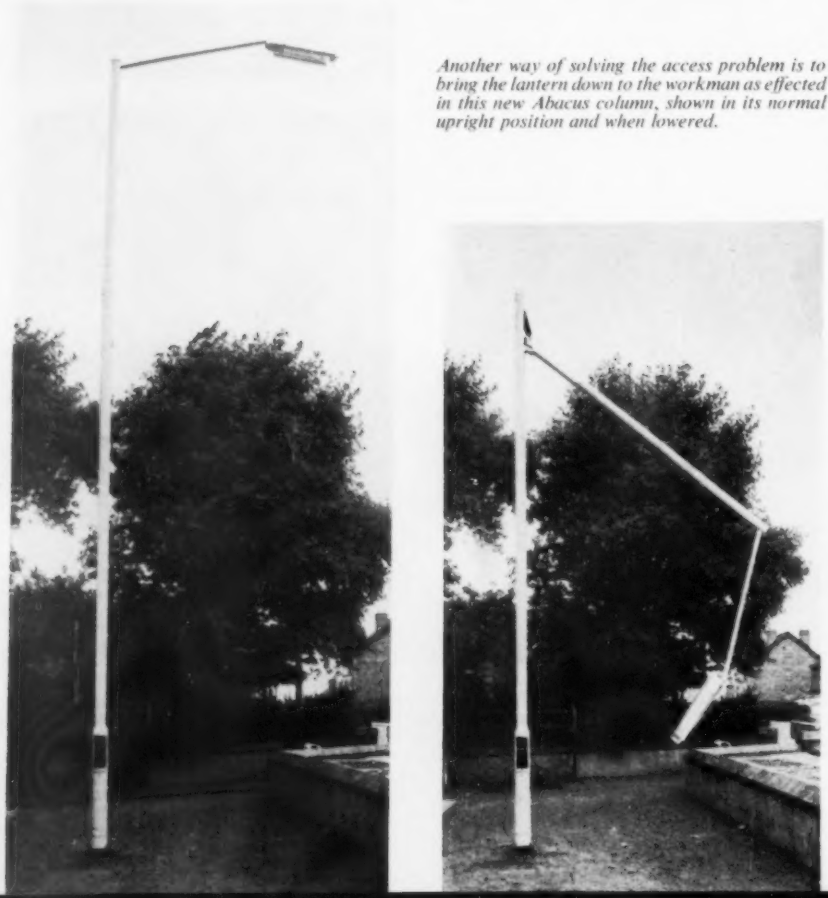


To facilitate fitting of, and access to, control gear, Stewarts and Lloyds are now providing this slip-in door on all their column bases.

Of general features of the exhibition, most visitors will have found the films of column collision studies carried out by the Road Research Laboratory most impressive. Motorists among the audience must have come away feeling that, if they ever were to be so unfortunate as to hit a column, then at least let it be made of sheet steel.

Mention must be made of the excellent model of Barry, illustrating the new seaside landscape designed by Mr G. A. Jellicoe for the Borough. The model, complete with streetlighting in the form of medical lamps, was featured on the Siemens-Ediswan stand, and the display successfully conveyed the effect of floodlighting and other public illuminations, using the 'visual emphasis' technique developed by the firm for its public lighting demonstration models, and in which floodlit areas and points of illumination are picked out in fluorescent paint.

In all the exhibition, the 1960 Conference theme was caught most directly by EDA, who introduced their new booklet 'Streetlighting—the Changing Scene' and drew attention to its salient features by displaying excerpts. Altogether, the visitor was left with the impression that if this was a 'wait and see' exhibition, there is certainly going to be something to see in the near future.



Another way of solving the access problem is to bring the lantern down to the workman as effected in this new Abacus column, shown in its normal upright position and when lowered.

TUBULAR STEEL LIGHTING COLUMNS FOR BIRMINGHAM'S INNER RING ROAD

S&L

All our standard columns are now supplied with the new plain slip-in door.

Planning for the safety of motorist and pedestrian after dark has become a matter of ever increasing importance. The Inner Ring Road in Birmingham is a typical example of how this problem is being tackled.

For the project, planned by the City Engineer and Surveyor, Sir Herbert J. Manzoni, C.B.E., S & L supplied tubular steel lighting columns which were specially designed to provide a mounting height of 30 ft.

The columns are fitted with 4 ft. 6 in. diameter post-top lanterns each with three Osram 400 watt colour corrected mercury lamps. The lanterns were developed and manufactured by the Lighting Division of the G.E.C.

S & L are supplying a total of 2,500 tubular steel columns of a different design for other lighting projects in the Birmingham area.

STEWARTS AND LLOYDS LIMITED

Tubemakers for a Century

GLASGOW · BIRMINGHAM · LONDON

Columns Galore

Peter Whitworth, Secretary of the Street Furniture Panel of the Council of Industrial Design, comments on the columns and lanterns shown in the outdoor display at Folkestone during the APLE conference

ONE OF THE REMARKABLE FEATURES associated with the street lighting engineers' autumn pilgrimage to their annual conference is the outdoor exhibition provided by the column and lantern manufacturers. Even though accustomed to this being impressive and expecting it to be so, the display at Folkestone comes as quite a surprise in its magnitude. This vast array of columns, all mounted in one perfectly straight line, is impossible to assess (and equally impossible to photograph) until, having recovered from the shock, one starts to plod slowly along the line.

This is undoubtedly an astounding display; one hundred and nineteen columns were counted and one reaches the end of the line exhausted and with a sense of relief—though, in my own case, also with a feeling of disappointment.

Out of so many exhibits, one would expect to find a fair number of worthwhile new columns, and while there are perhaps a few there seem to be less than in previous years. In previous years, also, there did not seem to be as many mistakes.

Gathering one's thoughts at the far end of this line, one realizes that the very multiplicity of columns is a considerable disadvantage and that they can only be assessed one by one. Looking back to the far distance, even in the general view, an unfamiliar skyline pattern now registers; there is something different about many of the brackets and lanterns and the author's rather depressed feeling gives place to one of admiration at the refinement and elegance of many of the column tops. Working back up the line, detailed study of the display reveals that the taller columns of up to 35 ft. have really arrived and that the all-too-familiar cumbersome fluorescent lanterns are few and far between.

This detailed study reveals a small number of good columns, but very few of them are fitted with lanterns selected to relate properly. These few are completely overshadowed by the mass of mediocre designs, many of which, while not too bad in their components, have been assembled with poor choice of lanterns and brackets, and seemingly deliberately decorated to show them to their worst advantage. As this is a selling

1 and 2. General views of part of the exhibition; the refinement and elegance of the high metal brackets are obvious. With mounting heights of this order, it is imperative that the visual mass be kept to a minimum. The standard Group A columns look lumpy by comparison

exhibition from the manufacturers' point of view, it is difficult to understand why so few take the trouble to display their wares properly.

The physical difficulties of arranging the exhibition did not help in appreciation of the designs, which could only be seen in their entirety from behind—i.e. with the brackets facing away from the viewer. Although the columns were mounted normally, with brackets over the road, the latter was all too narrow, and cars were parked nose to tail along the complete stretch, making it rarely possible to see the base of the columns if viewed from the proper standpoint.

Having this spectacle in so public a place has its advantages however, as local residents and holiday makers mixed with delegates and the reactions of genuine passers-by could be easily heard. Two dear old ladies, having trudged along the complete array, were heard to say:

'I think I like the dark ones best don't you?'

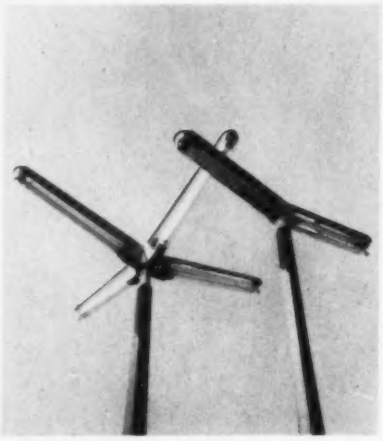
'Oh! I don't like the big ones, I far prefer the small ones!—but they all make a mess of the grass don't they?'

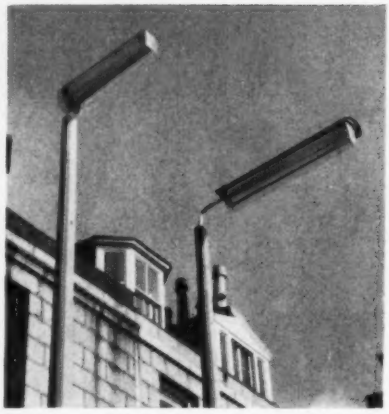
Other overheard comments proved that very few of the public had the slightest idea of what it was all about and in view of their marked interest it seemed that more details of the exhibition and the exhibits would have been appreciated.

The few well-designed items are rewarding when they are located and, as might be expected, they are to be found among the better displayed equipment. The Atlas Gamma 4 and 5 lanterns on their Abacus steel columns, which received a Design Centre Award from the Duke of Edinburgh this year, have been joined by the Gamma 3 of 20 ft. mounting height, thus completing the 'set'. The company have also introduced a new lantern, the Alpha 5, employing a 200-watt linear sodium tube. This lantern visually is commendably small, and has a fine simple line, looking remarkably pleasant when seen mounted.

AEI also have made a large contribution to design not only with their aluminium Leader column, which won the Aluminium Development Association's competition, but with new compact lanterns. Last year the sodium Amberline showed us a new way to terminate a column with a new form of 'post top' lantern and a version allowing double arm mounting and outreach brackets has just been introduced.

Concrete Utilities have provided one of the surprises with their tall metal bracketed concrete columns fitted with the new slim Phosware sodium lanterns. The versions illustrated in





3, 4 *and* 5. *Among those classed as curiosities by the general public; they seem to be strangely unrelated to current thinking. It is difficult to visualize these being used without attracting undue attention to themselves.*

6. *First shown last year at Aberdeen, AEI demonstrate a new solution to one of the most difficult design points, the transition between the vertical line of the column and the near horizontal lantern. Architecture's 'plane of recession', used in both classical and modern architecture to join two awkward masses with an unobtrusive link, has been used to good advantage.*

7. *Not ancient and modern as might be supposed but two lanterns in current production by Phosware.*

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4	5
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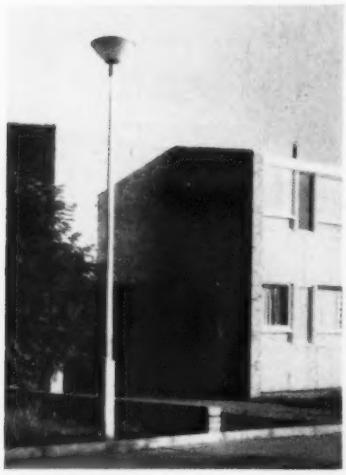


8. *This Stewarts and Lloyds/Eleco unit is one of our most successful examples of the* 35 *ft column in this country. The junction between lantern and bracket could be improved, but in spite of this, it is a fine example, having good proportion and grace.* (*Stewarts and Lloyds Ltd. photo.*)

9. *This column of Abacus may have far-reaching consequences in the appearance of columns. Already accepted on the Continent this approach may well enable a new appraisal of the maintenance problem.* (*Abacus Eng. Ltd. photo.*)

10. *The AEI Leader/Ashby unit, and* 11 *the Atlas Gamma* 5 *are among the rare examples of the column and lantern being designed together as one unit.*

Fig. 2 are by no means as graceful as the column with the straight taper, their bulging base detracting from the essential simplicity. Properly sited in suitable conditions the straight-sided columns are far more elegant than many.

The designs mentioned are 'unorthodox' (which in street lighting is usually interpreted as not looking like gas lamps), but they are only unorthodox in so much as they are sound logical designs resulting from intelligent study of the problem and an appreciation of modern manufacturing techniques. Too rarely are these qualities seen in street furniture and all too rarely do we see evidence of understanding the true purpose of a lighting column: which is simply to hold the lantern in such a position that it can perform its function properly. It is of equal importance that it does this sensibly and discreetly having due regard to the backgrounds in which it will be used. As the light sources in modern lanterns bear little resemblance to gas burners it is pointless to attempt to make high output lanterns look like period pieces and equally ridiculous to expect to find an answer to today's (and tomorrow's) problems in the past. What has so frequently been done in street lighting is as ludicrous as trying to make an atomic submarine look like the *Cutty Sark*. Sailing ships, like gas lamps at their best, were very fine, but let us draw from the knowledge of design and proportion that went into these rather than mis-apply their outward appearance.

The progressive manufacturers in the lighting industry, who not only solve the technical problems but also design their products properly, are to be commended and respected, but the support of the buyers is required to maintain this progress if we are to change a situation where a distinguished visitor was overheard to ask a manufacturer why so many of his columns were so ugly—the reply was 'because the customer wants them that way!'

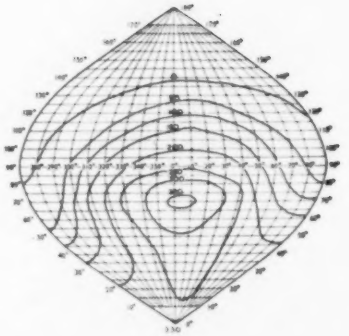
The 1960 Exhibition definitely contains good street furniture, some of it as good, if not better, than anything else in the world, but the overall impression of the exhibition does not reveal this. In fairness to the man in the street as well as the technicians developing the new light sources, something must be done. The overall picture could be changed surprisingly quickly by more critical and selective buying by the engineers—and even more quickly by the manufacturers if they would exhibit only their very best products.

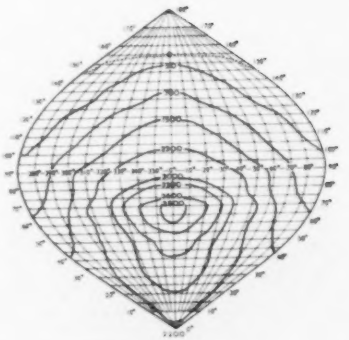
8 | 9
10 | 11

New Street Lighting Lanterns

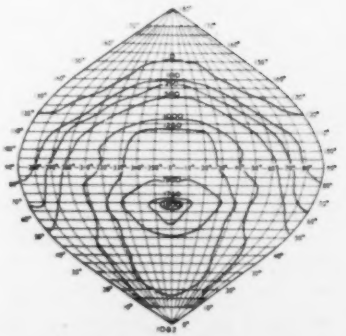
Mercury lamp (tube and bulb) lanterns

Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
 AEI Siemens-Ediswan 'Crawley' side entry Group B	Two 2 ft, 40W MCF/U	Body consists of pressed aluminium canopy covering a central concealed internal cantilever bracket bolted to aluminium alloy casting which supports the lantern on the column top	Polished aluminium reflectors with "Perspex" bowl diffuser	(*a*) 83% (*b*) 1·4
 AEI Siemens-Ediswan Twin "Kuwait" catenary spanwire Group A	Four or eight 5 ft, 80W MCF/U	Each arm consists of tapered pressed aluminium canopy covering a central concealed internal cantilever bracket bolted to aluminium alloy casting	Polished aluminium reflectors with "Perspex" bowl diffuser	(*a*) 85% (*b*) 1·7
 AEI Siemens-Ediswan Twin "Court" catenary spanwire Group A	Four or eight 4 ft, 40W MCF/U	Each arm consists of tapered pressed aluminium canopy covering a central concealed internal antilever bracket bolted to aluminium alloy casting	Polished aluminium reflectors with "Perspex" bowl diffuser	(*a*) 85% (*b*) 1·7



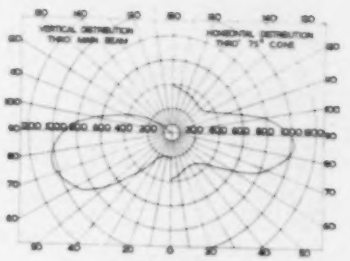


with eight lamps



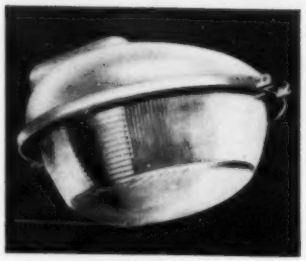
with four lamps

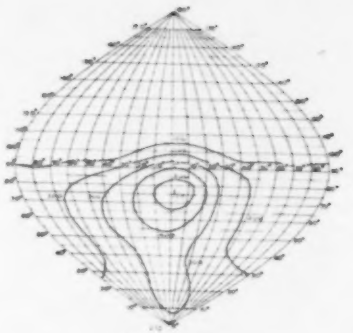
Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
Eleco "Baldock" Mk. III Group B	80/125W MBF/U	Die-cast aluminium canopy with one-piece die-cast bowl ring	Glass refractor bowl	(a) — (b) —



with 125W MBF/U

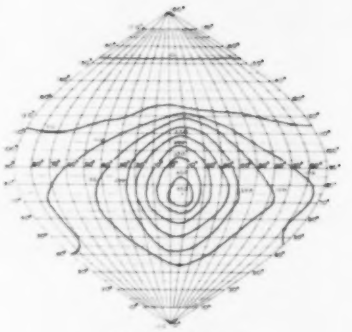
GEC Z.8490 "Tyne" Group B	60/200W g.l.s. or 80/125W MBF/U or MB/U	Die-cast aluminium alloy body	Pressed prismatic glass refractor bowl	(a) 70% (b) 2·2



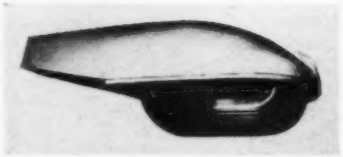


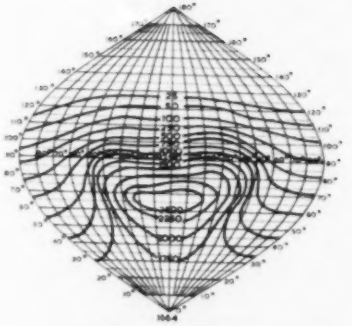
with 80W MBF/U

GEC Z5590 "Tees" Group B	60/200W g.l.s. or 80/125W MBF/U or MB/U or 45W So/H	Die-cast aluminium alloy body	Prismatic glass dome refractor or pressed prismatic glass bowl refractor or both	(a) 75% (b) 2·5



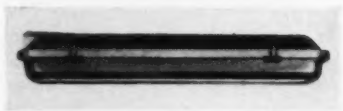
with 80W MBF/U

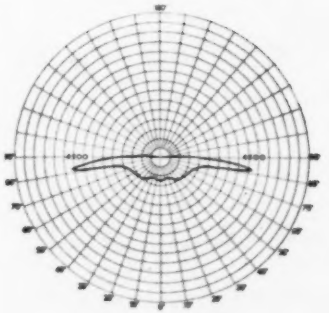
	Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
	Revo "Horizon Major" Group A	250/400W MA/U or MA/H or MBF/U	Body and refractor support of silicon aluminium alloy. Control gear housed in separate compartment	Pressed glass refractor bowl and anodised aluminium interior reflector	(*a*) — (*b*) —



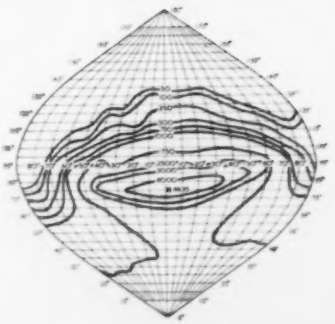
with 400W, MBF/U

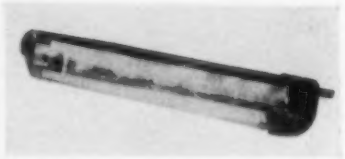
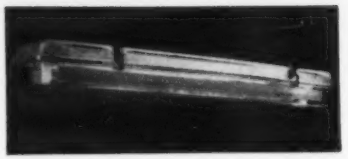
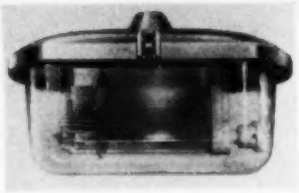
Sodium lamp lanterns

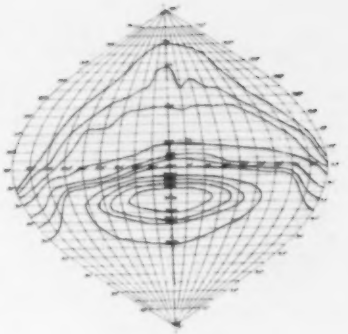
	AEI Siemens-Ediswan "Oline" side entry, cut-off Group A	200W linear SoI/H	Body is aluminium alloy casting with accommodation for one set of control gear on tray. Side opening "Perspex" bowl enclosure	Reflector	(*a*) 78% (*b*) —

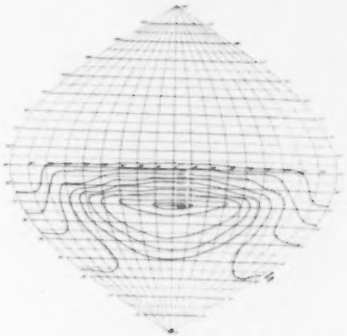


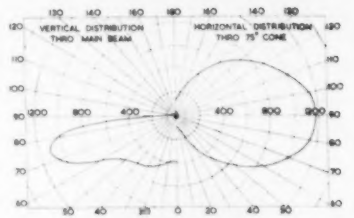
	AEI Siemens-Ediswan "Osprey" side entry (with provision for control gear)	200W linear SoI/H	Body of lantern consists of pressed aluminium canopy covering a central concealed internal cantilever bracket bolted to aluminium alloy casting within which control gear is housed. A version is also available without provision for control gear	Polished aluminium reflector with "Perspex" bowl diffuser system	(*a*) 80% (*b*) 2



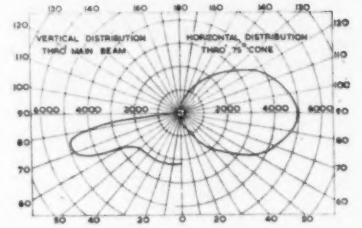
Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
 AEI Mazda "Amberline" side entry Group A	200W linear So/H	Main casting of silicon aluminium, integral canopy of grey and clear "Perspex"	"Perspex" refractor plate sealed to bowl	(a) 76·8% (b) 1·98
 Atlas "Alpha Five" Group A	200W linear So/H	Pressed aluminium canopy with aluminium support casting. Bowl of acrylic plastic	Polished aluminium reflector and acrylic refractors sealed to bowl	(a) 75% (b) 2·0
 Eleco "Golden Ray" Mk.X Group B	45/60W So/H	Die-cast aluminium canopy with one-piece cast bowl ring	"Perspex" bowl with sealed-on refractor plates	(a) — (b) —
 Eleco "Golden Ray" 200 Group A	200W linear So/H	Die-cast aluminium canopy. One-piece "Perspex" bowl with one-piece bowl ring and sealed in refractor plates	Refractors	(a) — (b) —

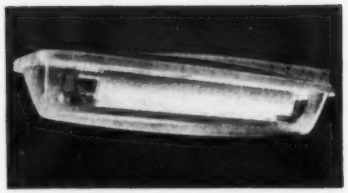
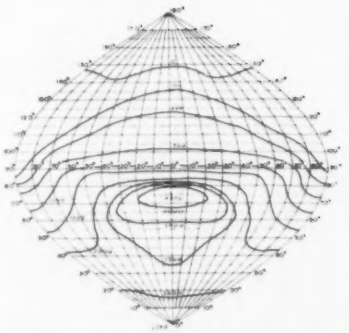
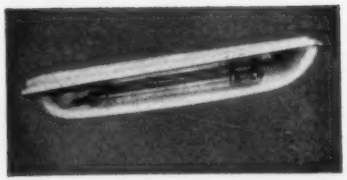
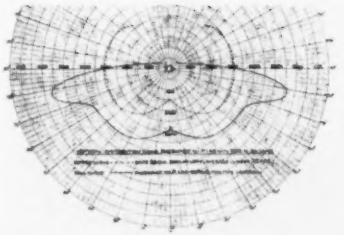
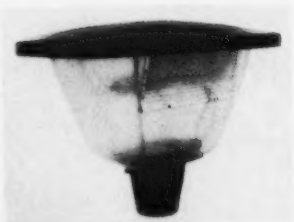
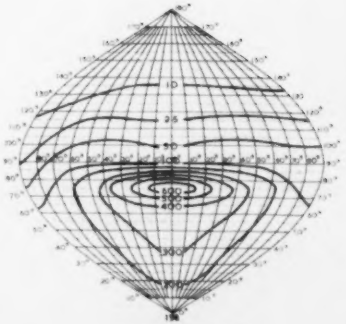


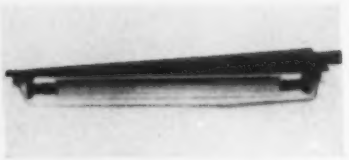


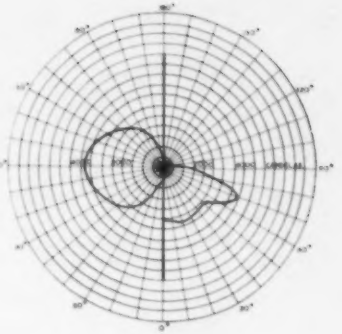


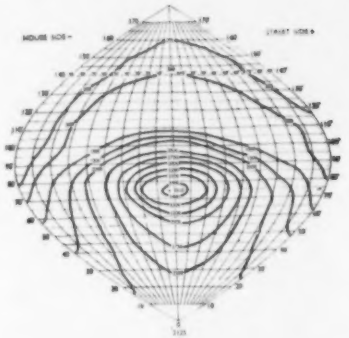
with 60W So/H



	Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.	
	GEC Z9500 Group A	200W linear SoI/H	Die-cast aluminium alloy body	"Perspex" refractor plates sealed to the inner sides of "Perspex" bowl	(*a*) 81% (*b*) 2·1	
	Phosco SO280 "Universal" Group A	200/280W SoI/H	Hood is available either as aluminium-alloy casting or in self-coloured resin-bonded glass fibre, enclosed by "Perspex" bowl	Reflector or refractor	(*a*) 84% (*b*) 2·1	 *for refractor lantern, with 280W SoI/H*
	Revo "Bromley" Group B	45/60W So/H	Cast-iron base with canopy of silicon aluminium alloy. Moulded "Perspex" bowl	"Perspex" refractor plates sealed to inside of bowl	(*a*) 76·3% (*b*) 2·65	 *with 60W So/H*

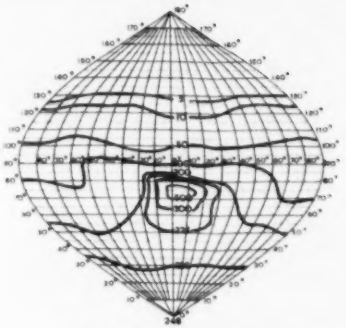
	Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
	Revo "Hyperion" Group A	200W linear Sol/H	Cast silicon aluminium alloy body and "Perspex" bowl	Refractor plates sealed to bowl. Anodised aluminium internal reflector is optional	(*a*) — (*b*) —
	Wardle "Aureole" Group A	200W Sol/H	One-piece aluminium alloy body with "Perspex" enclosure	"Perspex" refractor plates sealed to inside of enclosure	(*a*) — (*b*) —





Tungsten lamp lanterns

	Revo Group B lanterns	60/200W g.l.s. or 50/125W MB/U or MBF/U	Range of lanterns with top or side entry and open or enclosed types. Body and ring of diecast aluminium	Glass or "Perspex" dome refractors or bowls. Internal aluminium reflector	



with 150W g.l.s. tungsten

Names and addresses of firms whose lanterns are described on pages 323-328

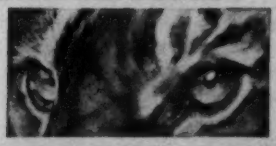
AEI Siemens-Ediswan: Lamps and Lighting Department, AEI Radio and Electronic Components Division, 38/39 Upper Thames Street, London, EC4; AEI Mazda: AEI Lamp and Lighting Co Ltd, Melton Road, Leicester; Atlas Lighting Ltd, Thorn House, Upper St Martin's Lane, London, WC2; Eleco: Engineering and Lighting Equipment Co Ltd, Sphere Works, St Albans, Herts; General Electric Co Ltd, Magnet House, Kingsway, London, WC2; Phosco Ltd, Hoe Lane, Ware, Herts; Revo Electric Co Ltd, Tipton, Staffs; Wardle Engineering Co Ltd, Old Trafford, Manchester 16




A everywhere you look





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Exteriors, Entrance Halls, Exits, Embassies.
Floodlighting, Factories, Football Grounds, Film Studios.
Garages, Guildhalls.
Hospitals, Houses, Hotels, Highways, Halls.
Industry, Institutes, Inns.
Jibs, Jewellers, Jetties.
Kitchens, Kindergartens.
Lecture Halls, Lodges, Libraries, Lobbies.
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Universities, Underwater.
Van Docks, Vestibules, Vaults.
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Xmas Street Decorations.
Yards, YMCA Hostels.
Zoos, Zebra Crossings.

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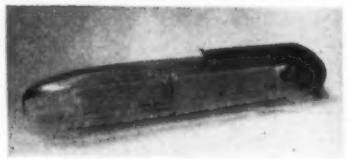
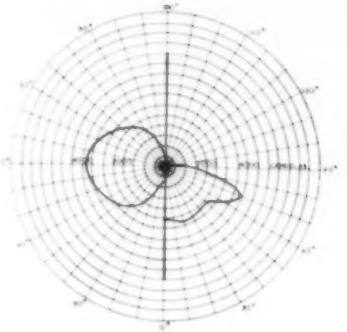
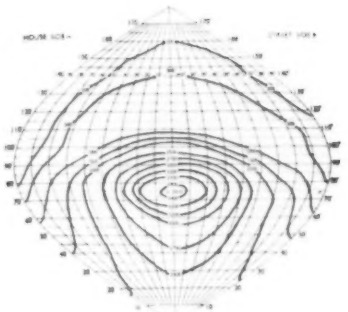
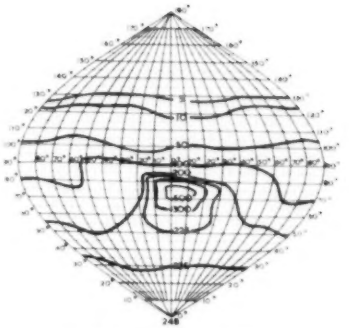
Lantern	Lamp	Construction	Optical System	(a) Efficiency (b) D.I.R.
 Revo "Hyperion" Group A	200W linear Sol H	Cast silicon aluminium alloy body and "Perspex" bowl	Refractor plates sealed to bowl. Anodised aluminium internal reflector is optional	(a) — (b) —
 Wardle "Aureole" Group A	200W Sol H	One-piece aluminium alloy body with "Perspex" enclosure	"Perspex" refractor plates sealed to inside of enclosure	(a) — (b) —





Tungsten lamp lanterns

 Revo Group B lanterns	60/200W g.l.s. or 50/125W MB U or MBF U	Range of lanterns with top or side entry and open or enclosed types. Body and ring of die-cast aluminium	Glass or "Perspex" dome refractors or bowls. Internal aluminium reflector	



with 150W g.l.s. tungsten

Names and addresses of firms whose lanterns are described on pages 323-328

AEI Siemens-Ediswan: Lamps and Lighting Department, AEI Radio and Electronic Components Division, 38/39 Upper Thames Street, London, EC4; AEI Mazda: AEI Lamp and Lighting Co Ltd, Melton Road, Leicester; Atlas Lighting Ltd, Thorn House, Upper St Martin's Lane, London, WC2; Eleco: Engineering and Lighting Equipment Co Ltd, Sphere Works, St Albans, Herts; General Electric Co Ltd, Magnet House, Kingsway, London, WC2; Phosco Ltd, Hoe Lane, Ware, Herts; Revo Electric Co Ltd, Tipton, Staffs; Wardle Engineering Co Ltd, Old Trafford, Manchester 16

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Floodlighting, Factories, Football Grounds, Film Studios.
Garages, Guildhalls.
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Industry, Institutes, Inns.
Jibs, Jewellers, Jetties.
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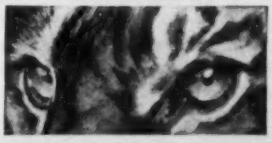
Restaurants, Railways, Restrooms.
Shops, Streets, Schools, Stages, Ships.
Theatres, Transport, Town Halls.
Universities, Underwater.
Van Docks, Vestibules, Vaults.
Workshops, Waiting Rooms, Warehouses.
Xmas Street Decorations.
Yards, YMCA Hostels.
Zoos, Zebra Crossings.







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The Design of Lamp Columns for Roads with Few Pedestrians

Vehicles frequently leave the road and collide with a lighting column thus reducing somewhat the considerable benefits of street lighting. For roads where there are few pedestrians and particularly where vehicles travel at high speeds it seems desirable to investigate the possibility of using columns which yield on impact. In this article the results of impact tests on three types of Group A street lighting columns are reported.

By R. L. MOORE, M.Sc., Tech., A.Inst.P., and A. W. CHRISTIE, M.A., B.Sc.*

IT HAS BEEN CONCLUSIVELY demonstrated that good street lighting reduces the casualty rate during the hours of darkness on all-purpose roads in built-up areas[1] and it seems likely that this would also be the case on other types of road. However, the good effect of the lighting is somewhat offset by collisions between vehicles and the columns used to support the street lighting lanterns (Fig. 1). The number of occupants or riders of motor vehicles injured in this way is considerable. In England and Wales there were ninety deaths in this type of accident in 1958. The number of casualties is unknown but likely to be several thousand; in 1957 there were about 800 in the Metropolitan Police District alone. Although it is sometimes argued that the blame for the accident lies with the motorist in these cases and not with the column, the fact remains that the existence of lighting columns is an additional hazard.

A very rough estimate of the relative magnitudes of the good effect of street lighting and the bad effect of street lighting columns can be obtained as follows. Tanner and Harris[2] estimated that the relative casualty rates in different conditions of lighting are approximately 1·0 for daylight, 1·6 for the average conditions of street lighting in built-up areas and 2·0 during the hours of darkness without street lighting. On this basis the average effect of existing street lighting is to reduce the number of casualties during the hours of darkness by about 20 per cent and the total number of casualties by about 6 per cent (since the proportion of casualties occurring during the hours of darkness is about 30 per cent). If an estimate obtained for the Metropolitan Police District in 1956 is acccepted as applying to built-up areas as a whole, then approximately 1·5 per cent of all casualties are occupants or riders of motor vehicles which have collided with lighting columns. Although it is impossible to say with any high degree of confidence what would happen if the same street lighting could be provided without the use of columns, presumably the total number of casualties could not be reduced by more than 1·5 per cent or by about 3,200 using 1958 figures. That is, the benefits of street lighting might be increased by roughly a quarter if there were no columns. The improvement might be less if the removal of the lighting columns led to an appreciable increase in the number of casualties to pedestrians on the footpaths or if there were still casualties to drivers in the absence of columns.

The overall effect is probably quite different on the different types of road ranging from streets in busy centres, where speeds are low and the volume of pedestrian traffic high, to motorways where speeds are high and where no pedestrians are permitted. Although no lighting has yet been installed on motorways in Great Britain, many fast open roads, on which there are few pedestrians, are being lighted. On one

Fig. 1. A fatal collision with a lighting column.
(Photograph by courtesy of the Chief Constable, Hertfordshire County Constabulary)

* The authors are with the Road Research Laboratory, Department of Scientific and Industrial Research.

such road it is known that lighting columns are being knocked down at the rate of nearly 7 per cent per annum. Such a high proportion of collisions with columns is not surprising on high speed roads. Many of these accidents are due to one vehicle only running off the road (roughly half of the non-junction accidents on the M1 are of this type), and the frictional resistance between the road and the vehicle tyres limits the angle at which it is possible to leave the carriageway in these circumstances. For example, in the case of a car travelling at 60 m.p.h. on a dry road where the frictional coefficient is likely to be about 0·8, the maximum angle at which the vehicle can cross a line of columns 10 ft to the left of its initial path is about 15 deg. and the probability of it hitting one is about 1 in 5 for columns spaced at intervals of 120 ft. In wet weather the coefficient of friction is unlikely to exceed 0·3 and the probability of collision is unlikely to be less than about 1 in 3. In cases where the vehicle slews round and presents a bigger striking surface the probability is further increased. It is with columns on such roads, where speeds are high and pedestrians few, that this article is primarily concerned.

Undoubtedly the ideal solution would be to have street lighting without any columns but on the type of road under consideration there are rarely sufficient tall buildings to support the lanterns. Some reduction in risk of collision might be obtained by having a clearance greater than the conventional 18 in. between the columns and the carriageway but the amount of such a reduction is not known. In one investigation in France[3] it was found that the overall accident rate was about 50 per cent higher on sections of a road with trees within 1 metre of the carriageway than on other sections of the same road with no trees, and was even greater if crossroads were excluded. Another possibility is to accept the fact that columns will be hit and to try to reduce the risk of injury to vehicle occupants by designing the columns in such a way that they offer less resistance to a colliding vehicle. The risk of personal injury in such a collision depends primarily on the rate and direction of deceleration of the vehicle; it increases with the massiveness of the column, its resistance to bending and shearing, and the rigidity of its fixing in the ground. There are, of course, in a particular accident numerous other factors, such as the type of vehicle, its speed, and the manner of its approach. If a column can be made which will not resist unduly the passage of the vehicle it is likely that its use would be beneficial on fast roads with few pedestrians. A column which is easily knocked down or displaced would of course be dangerous to pedestrians, and on roads where they are numerous it is not clear whether its use would be an advantage.

The remainder of this article describes some preliminary tests which have been carried out to find whether there are any major differences in impact resistance between commonly used types of Group A columns.

Fig. 2. A test collision in progress.

Columns tested

Three types of Group A lighting column, all designed to similar specifications as regards strength (the wind loads and lantern loads which they will survive) and rigidity (deflection of lantern under wind loads), were tested. They were:

Type C—a pre-stressed concrete column to BS 1308 : 1957

Type S—a tubular steel column to BS 1840 : 1960

Type A—a thin sheet steel column to BS 1840 : 1960

Tests were carried out with two identical columns of each type. All were intended to give a 25 ft mounting height when planted 4 ft in the ground and were for use with brackets giving normal outreaches (up to about 8 ft). For the tests, brackets giving a 6 ft outreach were used but no lanterns were fitted. No significance is attached to the particular makes used except that they are in common use and believed to be representative of their type.

Erection of the columns

The resistance offered by a column to a vehicle colliding with it must depend to some extent on whether the base of the column is firmly or loosely held in the ground. Some authorities concrete round the base and others do not. For these tests the following procedure was adopted:

(1) A cubical hole with a 4 ft side was dug.

(2) The butt of the column was lowered on to a steel base plate.

(3) Round the base of the column a collar of quick-setting concrete, 1 ft deep and 1 ft wide, was laid.

(4) Some of the earth was back-filled and rammed to a depth 2 ft below the surface.

(5) A second collar of concrete, identical to the first, was then applied.

(6) More earth was back-filled and rammed to ground level.

The minimum time between the erection of the column and the test was three days.

The method of fixing is that used for columns planted in unpaved verges. It is likely that the columns tested would offer greater resistance to impact if they were mounted in a paved footpath.

Method of testing

The method was to run nominally identical cars head-on into the columns at approximately equal velocities (Fig. 2). For this purpose a number of pre-war 8 h.p. saloon cars of the same make and model were saved from breakers' yards and adapted so that when towed by a second vehicle

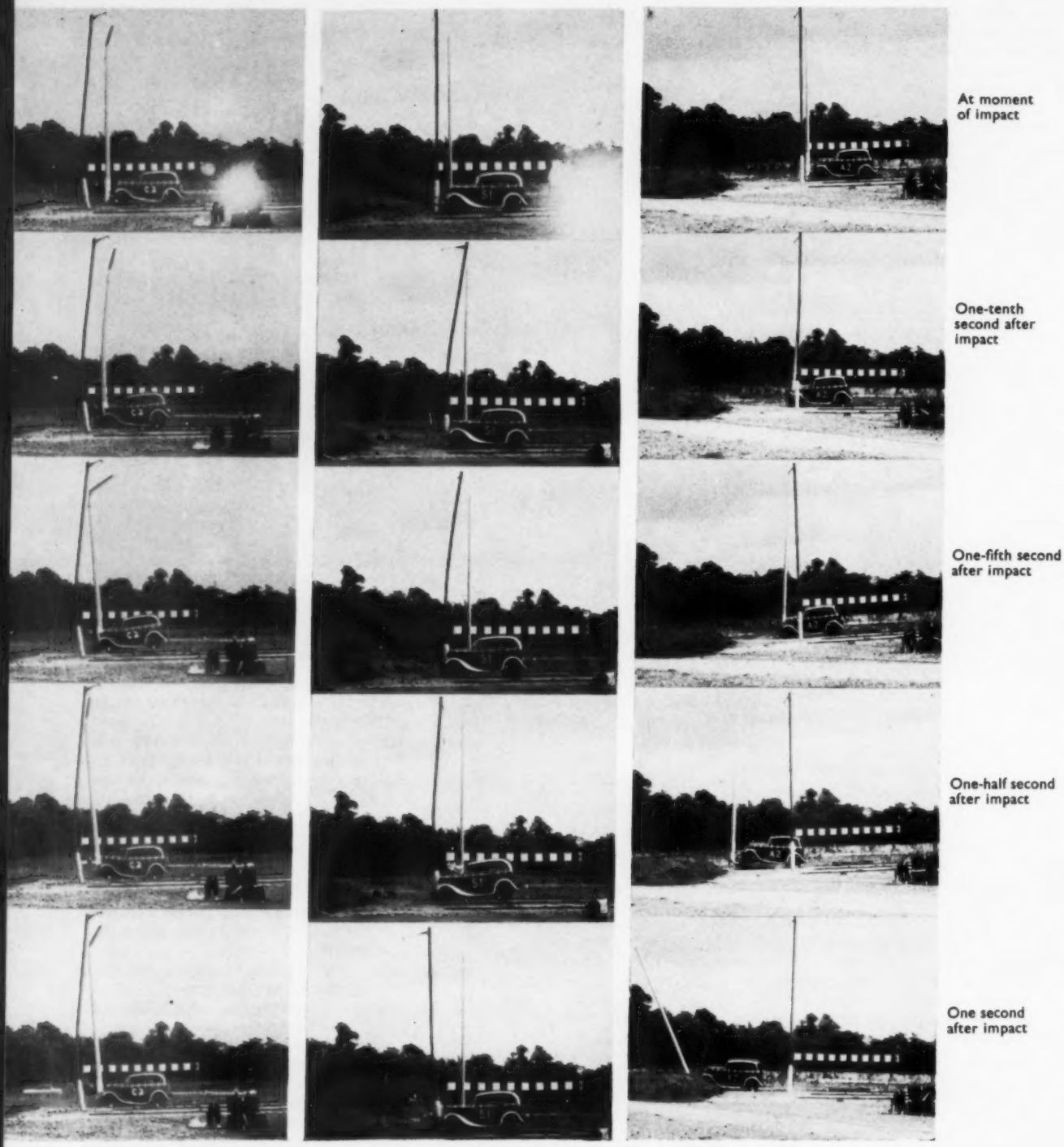

Fig. 3. Progress of collisions at timed intervals from the moment of impact with the three types of columns used in the tests.

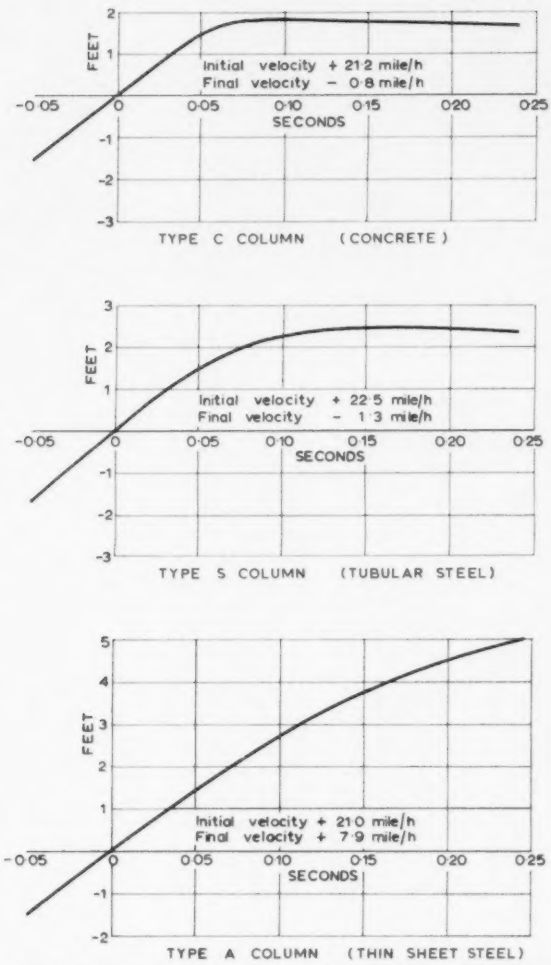

Fig. 4. Distance/time curves obtained from the film records. Zero time is taken as the instant the bumper struck the column; the distance indicates the position of the car relative to its position at the moment of impact.

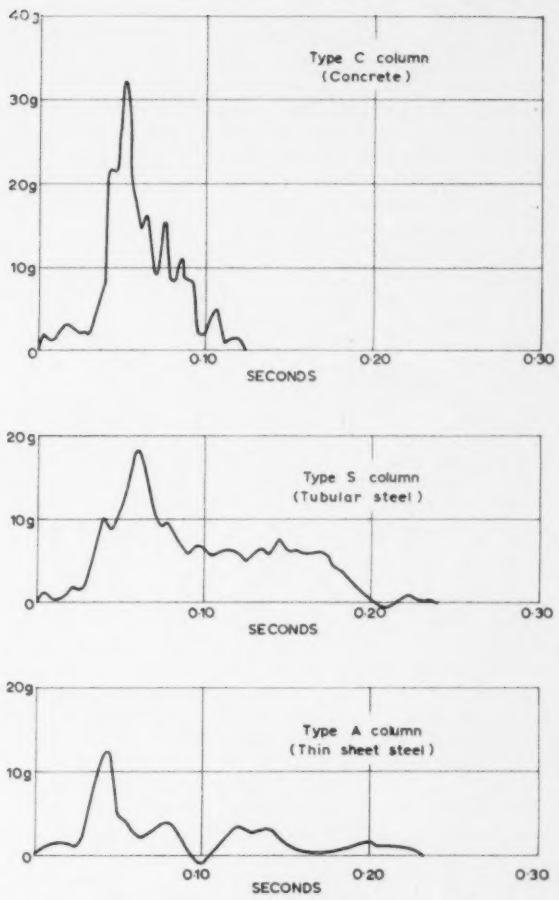

Fig. 5. Deceleration/time curves for the three types of column. Zero time is taken as the instant the bumper struck the column; g represents the acceleration due to gravity (32·2 ft/sec²).

they could be steered towards the column by a shoe running on a single rail fixed to the ground. It is not the purpose of this article to describe the details of the methods used but it is relevant to note that the cars struck the columns centrally (with an accuracy of ± 2 in) at a velocity of 22 mph (with an accuracy of ± 1·5 mph). The weights of the cars plus equipment were within the range 1,750 lb (± 5 per cent). To allow for possible failure of any one piece of the recording apparatus most measurements were duplicated. The following data were recorded:

(i) the velocity of the car immediately before impact (using pneumatic detectors fixed to the ground);

(ii) the position of the car body as a function of time (from films taken at both 150 and 1,000 frames per sec, the exact frame speeds being obtained from a clock also in the field of view);

(iii) the deceleration of the chassis of the car as a function of time (from a pair of accelerometers mounted on the chassis of the car, the outputs from which were fed via trailing cables to cathode ray tubes whose traces were recorded on photographic paper).

Comparative measurements were made before and after the tests to establish the distortion of the cars' structure.

Method of analysing the recorded data

Since the motion of the car could be obtained from both the decelerometer records and the films it proved helpful to use one estimate as a check on the other. The decelerometer records were too small to guarantee high accuracy though some improvement was obtained by using two decelerometers with overlapping ranges.

The velocities of the car immediately before and after the impact were obtained from the films. The end of the impact was taken as the time when the decelerometer record returned to zero. The value of the initial velocity obtained from the pneumatic detector provided a useful check on the accuracy but was not used in the analysis.

Although the two accelerometers were capable of covering different ranges (one up to a maximum of a 100 g* and the other up to a maximum of 20 g*), the records were too small to give high accuracy. For this reason, the course adopted was to adjust each record proportionately all the way along so that the estimate of the change in velocity obtained from the area under it agreed with the difference between the initial and final velocities which could be obtained with a high degree of accuracy from the films. The estimate of the initial velocity obtained from the pneumatic detector served as a check on the accuracy of the estimate obtained from the films.

* Here g represents the acceleration due to gravity, i.e. 32·2 ft/sec².

Results

Figs. 3(*a*), (*b*) and (*c*) show photographs taken at the moment of collision and at various intervals afterwards for one column of each type. Fig. 4 gives the displacement/time curves derived from the films and Fig. 5 gives the deceleration/time curves obtained from the accelerometers. The data from the tests on the second column of each type are in close agreement with those given here.

What happened with the columns of type A (thin sheet steel) is quite different from what happened with the columns of types C (concrete) and S (tubular steel). Type A bent and tore off 1 ft underground (i.e. at the top of the concrete collar which coincided with the top of the cable entry slot) allowing the car to carry on at reduced velocity (about 8 mph). Types C and S deflected momentarily but remained more or less upright stopping the car and causing it to rebound with a small velocity (about 1 mph).

Although both the type C and type S stopped the car, the type C (concrete) did so more violently than the type S (tubular steel). With the type C the deceleration was concentrated into a period of approximately 1/10th of a second whereas with the type S the deceleration was spread over a period of nearly 1/5th of a second.

Clearly therefore the impact is least severe with the type A column (thin sheet steel) and most severe with the type C column (concrete).

This fact is also clearly illustrated by the decelerometer records. In each case there is a low deceleration (of the order of 2 g) over the first 0·025-0·03 sec followed by a peak deceleration lasting about 0·05 sec followed by a period of moderate deceleration. The low initial deceleration is experienced whilst the bumper and other 'soft' material at the front of the car are crumpling, and the peak deceleration occurs when the impact is transmitted to a transverse member of the chassis and the engine itself. The decelerations for the tubular steel column (S) are higher than those for the thin sheet steel column (A) but lower than those for the concrete column (C).

Damage to cars

As would be expected the damage to the cars was most severe for the concrete column (C) and least severe for the thin sheet steel column (A). In all cases the bumper collapsed and the radiator was pushed back. The front axle was bent with types C and S but not with type A. The engine was pushed back on the chassis a distance of 2½ in. with type C, ¾ in. with type S and not at all with type A.

Damage to columns

The concrete column (C) suffered severe cracking and the spigot carrying the bracket was bent. The tubular steel column (S) was badly distorted as shown in the photographs. The sheet steel column (A) was severely damaged near the base. In all three cases the columns would have had to be replaced (although in the case of type A column, which was of sectional construction, most of the sections could be used again).

Conclusions

Serious collisions between vehicles and lighting columns are now a frequent occurrence and are likely to be particularly severe on high-speed roads. To reduce the severity of the injuries in such cases it is desirable that the columns should yield on impact.

Preliminary tests on concrete, tubular steel and thin sheet steel columns (all satisfying similar specifications as regards their ability to cope with the loads produced by the lantern and the wind) show that they differ widely in the resistance which they offer to a colliding vehicle, the least resistance being offered by the thin sheet steel column.

It is possible that objections may be raised to the use of columns which yield on impact on the grounds that the number of columns destroyed may be greatly increased. However, it is pertinent to note that even in the moderate impacts with which this investigation was concerned all the columns would have had to be replaced.

Acknowledgments

The authors wish to thank their colleagues Mr A. E. Walker and Mr I. B. Laker who organized the tests and also Mr F. H. Stokes and Mr K. A. Parker who were responsible for the high-speed photography.

The work described was carried out as part of the programme of the Road Research Board of the Department of Scientific and Industrial Research. The article is published by permission of the Director of Road Research.

References

[1] Glanville, Sir William. Light and road safety. *Trans. Illum. Engng. Soc.*, 25 (2), 69–85 (1960).

[2] Tanner, J. C. and A. J. Harris. Street lighting and accidents: Some British investigations. CIE 13th Session, 1955 Vol. II, Paper G-T, pp. 21.

[3] Thedié, J. Une enquête sur la sécurité routière et les plantations d'alignement. *Rev. gen Routes*, 99 (335), 63–4, 67–9 (1959).

Lighting the New Approach to Blackwall Tunnel

A feature of the lighting of the new north approach to the Blackwall Tunnel is the variation in column length which was required to obtain a uniform mounting height for the lanterns. The columns installed on the approach parapets were specially manufactured at varying heights to cater for the slope. The scheme was designed and installed under the direction of the Chief Engineer of the London County Council, J. Rawlinson, CBE, M.Eng, M.Inst.C.E, M.I.Mech.E; main contractors were Cubitts, Fitzpatrick. The picture shows Concrete Utilities' Highway 'X' concrete columns adapted in this way, and carrying GEC lanterns employing three 80W tubular fluorescent lamps.

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25ft. **HIGHWAY 'X'** column with 5' 0" concrete bracket.

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35ft. **NEW HIGHWAY** column with 5' 0" tubular steel bracket.

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LIGHTING ABSTRACTS

OPTICS AND PHOTOMETRY

535.241.42

880. A simple circuit for a light source of constant intensity.
H. VAN SUCHTELEN, *Philips Tech. Rev.*, **21**, 229–233 (1959–60, no. 8).

A light source of constant intensity is commonly obtained by supplying an incandescent lamp from accumulators or a stabilized power supply. It is more logical, however, to stabilize the luminous intensity itself. A circuit designed for this purpose is described. The light source is a 6 V, 5 A incandescent lamp, supplied from a 220 V supply by means of a transformer having a saturated core to stabilize the voltage. A photoresistor in conjunction with five transistors regulates the luminous intensity, which remains constant to within 1% for voltage fluctuations of 20% in either direction. The effect of temperature variations is discussed; the intensity varies less than 0·2 per °C change in temperature.

535.231.5

881. Measurements of temperature in luminous arcs by means of radiation measurements.
A. BAUER, *Lichttechnik*, **12**, 406–407 (*July* 1960). *In German.*

In a high-pressure arc the plasma is nearly in thermal equilibrium and emits as a pure temperature radiator so that the temperature can be estimated by measuring the absorption at selected wave-lengths. The author describes measurements on a xenon arc at 25 atmos. pressure, the current being 25 amps and the voltage gradient 32·5 volts per cm. Using three prominent lines in the infra-red the mean temperature was found to be 8,740° K.

J. W. T. W.

LAMPS AND FITTINGS

621.327.59

882. New experiments on modulated high-pressure xenon arcs.
H. J. HENTSCHEL, *Lichttechnik*, **12**, 407–409 (*July* 1960). *In German.*

Describes a number of experiments on the effects of modulating a d.c. xenon arc with high frequency a.c. up to about 25,000 cycles. A number of different characteristics of the modulated arc were investigated. In particular it was found that modulation at 10,000 cycles caused the arc to contract somewhat and the intensity at the middle of the arc stream increased in relation to that near the edge.

J. W. T. W.

535.24

883. Use of computers in design and analysis of luminaires.
B. F. JONES, *Illum. Engng.*, **55**, 386–393 (*July* 1960).

An analogue computer has been used to determine the performances of luminaires whose light-controlling surfaces are diffuse or semi-diffuse, as opposed to specularly reflecting or refracting, a particular advantage being that luminaire efficiency, upward and downward flux components, mean luminaire luminance and flux distribution curves can be determined entirely by computation. The luminaires have to be broken down into no more than twelve basic surfaces, and the flux transfer coefficients (the shape factors or form factors) for these surfaces have to be programmed on to the computer. A protractor to facilitate determining these shape factors for long fittings is described. An accuracy to within 5–15 per cent is claimed, depending on the type of data required.

P. P.

621.327.43

884. Improvements in fluorescent lamp efficiency from particle size control of phosphors.
K. H. BUTLER and H. H. HOMER, *Illum. Engng.*, **55**, 396–403 (*July* 1960).

Present-day fluorescent lamps operate at approximately 75 per cent of their theoretical efficiency. In the search for greater efficiencies, it has been found that the presence of super-fine particles in the phosphor coating, present initially or produced during the milling process, are partly responsible for reducing the light output by diffusely scattering the ultra-violet energy back into the discharge arc. Restricting the particle sizes to limits of 3–30μ has improved efficiencies of 40 W lamps to 74 lm/W. Further increases to 80–95 lm/W have been effected by selecting the transmission of the phosphor coating to match the phosphor scattering coefficient and by adjusting the lamp arc operating characteristics.

P. P.

621.327.543.15

885. Use of fluorescent lamps with transistor inverters.
R. LEHMANN, *Lichttechnik*, **12**, 449–451 (*August* 1960). *In German.*

Describes the circuits used for operating tubular fluorescent lamps on a.c. derived from a d.c. supply by means of transistor inverters (see *Light and Lighting*, December 1958, p. 395). The voltage wave-form given by the inverter is almost rectangular; the current wave-form through the lamp is nearly triangular. A principal application is to the lighting of passenger transport vehicles, the d.c. supply being taken from a battery or from the track. A higher than normal frequency may be used to increase the efficiency of the lamps.

J. W. T. W.

536.4.628.95

886. Temperatures in fittings for incandescent lamps.
L. J. H. EXALTO, *Philips Tech. Rev.*, **21**, 300–303 (1959–60), no. 10).

For determining the heating of lighting fittings, it is desirable that standard heat test sources should be used in place of ordinary lamps. The problem is to design sources which will simulate, with reasonable exactness, the heating effect of incandescent lamps of the types normally used in the fitting. Extensive investigations into this heating effect, carried out with lamps of different wattages and sizes in different fittings, have led to the conclusion that temperature rises are not governed entirely by the wattage or by the temperature rise of the cap of the bare lamp freely suspended in air. Another important conclusion is that lamps with a coiled-coil filament cause smaller temperature rises in fittings than single-coil filament lamps which are otherwise completely similar.

621.326

887. Automatic control of a filament-coiling machine with the aid of pre-set counters.
F. EINRAMHOF and P. HAVAS, *Philips Tech. Rev.*, **21**, 209–315 1959–60, no. 10).

A description of an electronic circuit for controlling a winding machine for the coiling of filaments for incandescent lamps. Voltage pulses, derived from the rotation of the motor spindle, are applied to a counter equipped with cold-cathode tubes. Upon reaching a pre-set number of pulses (corresponding to the lengths of coiled and non-coiled sections), the counter controls power transistors which drive the actuating circuits of the process. This form of control is more flexible and versatile than conventional mechanical controls using cams.

LIGHTING

628.98

888. Colour and colour rendering of lights consisting of a continuous spectrum with superposed spectral lines.
H. W. BODMANN and E. VOIT, *Lichttechnik*, **12**, 359-361 (*June* 1960). *In German.*

Observers were asked to view a number of familiar objects and to assess the colour rendering qualities of lights made up of standard illuminant A (tungsten lamp) with the addition of different amounts of one of four spectral lines, in the violet (436), green (546), sodium yellow (589) and red (655). It was found that for equal additions of luminous flux the yellow produced the least colour distortion and the violet the greatest. The colour of each light was observed by judging the appearance of a piece of white paper and it was found that when the results were plotted on the chromaticity diagram the tolerance was greatest for the violet line and least for the red.

J. W. T. W.

612.843.6

889. Visual acuity under different kinds of light.
P. JAINSKI. *Lichttechnik*, **12**, 402–405 (*July* 1960). *In German.*

Visual acuity was measured with a Landolt ring by eleven observers ranging in age from 19 to 51. The test field was viewed under five illuminants, viz. tungsten, sodium, HPMV, colour-corrected mercury and fluorescent (white). The field luminance was varied from 0·01 to 400 cd/sq. metre. Visual acuity was found to

be lowest with tungsten and highest with sodium, although the differences observed were not great, viz. about 25 per cent at the lowest luminance and about 7 per cent at the highest. The results are compared with those of other workers. J. W. T. W.

890. Recommended practice for office lighting. 628.972
Illum. Engng., **55**, 313–344 (*June* 1960).

Prepared by the Office Lighting Committee of the American IES, this Recommended Practice brings up to date the document last revised in 1956, particular attention being given to the new recommended illumination levels (for example, 100 lm/ft² for regular office work) and to limitations on luminaire luminances. Environmental factors, such as the finishes of room surfaces and office furniture and equipment, are considered, and the more important characteristics of natural and electric lighting systems are reviewed. The Recommended Practice is copiously illustrated with photographs of recent office installations conforming both in quantity and quality of the light with the new recommendations. P. P.

628.93

891. New levels and scissors curve highlight revised office practice.
C. L. Crouch, *Illum. Engng.*, **55**, 345–348 (*June* 1960).

The new (1960) American Recommended Practice for Office Lighting advocates higher recommended illumination levels than formerly, together with a check (the 'scissors' curve) on the luminance limitations of luminaires for acceptable glare. The poor contrast of many visual tasks met with in offices leads to illumination recommendations of up to 200 lm/ft², based on Blackwell's work (Abstract No. 744). The scissors curve enables luminaire luminance data at a range of angles above nadir to be rapidly checked to ensure there are no excessive luminance contrasts likely to cause unacceptable glare discomfort. P. P.

892. Combined light and air solution at Harris Trust. 628.972
W. C. Johnson, B. S. Benson, jr. and R. S. Geocaris, *Illum. Engng.*, **55**, 351–354 (*June* 1960).

The lighting of Chicago's Harris Trust and Savings Bank combines with it the air conditioning of the building. Individual fluorescent luminaires are recessed flush with the 5 ft. square modules and can have air inlet or extract ducts connected to their tops. By using a relatively large number of air diffusers, each delivering a small air volume directed vertically downwards, partition location is made less critical and no air 'bounce' occurs to create draught conditions. P. P.

893. 'First class' perimeter lighting. 628.972
J. F. Finn, *Illum. Engng.*, **55**, 357–359 (*June* 1960).

The efficient use of office space calls for planned furniture arrangements often involving the desks being located adjacent to the office walls. Conventional spacing between the luminaires and the side walls means that such desks are then inadequately lit. This can be overcome by reducing the luminaire/side wall spacing to a maximum of 2 ft. 6 in. and the spacing from the ends of the luminaires to 6 in. In the case of 'floating' and wall-to-wall laylights, additional lamps or lamps of a higher lumen output should be put around the perimeters of the laylights. P. P.

894. Heating with light. 628.972
J. B. Browder, *Illum. Engng.*, **55**, 360–361 (*June* 1960).

When the lighting of the new Georgia Power Co building in Atlanta was redesigned to the American IES current recommended illumination levels, it was found that the equipment generated more BTU's than were necessary to heat the whole building on a 'design' (heating) day. On cold days, heating and cooling are needed simultaneously on the same floor, heating for perimeter offices and cooling for interior offices. To cope with this situation a dual duct or 'hot and cold' system was devised in which the heat from the recessed luminaires is extracted into the plenum system, from where it can be introduced into the cool rooms or, in summer, can be exhausted to the outside air. P. P.

628.971

895. Recommended practice for airport service area lighting.
Illum. Engng., **55**, 407–412 (*July* 1960).

Prepared by the Aviation and Signal Committee of the American IES, this Recommended Practice is concerned with the lighting of those operational outdoor areas of an airport, not directly involved in landing and taxying manoeuvres, where aircraft would be expected to move under power or by towing. The tasks performed in these areas are analysed and the limitations on luminaire location are indicated. The factors influencing lighting design for such areas are considered and acceptable methods for executing suitable designs are given. An average horizontal illumination of 0·5 lm/ft² and an average vertical illumination of 2·0 lm/ft² along the centre-line of the service area are advocated. P. P.

FOR THE BENEFIT OF THOSE wishing to obtain articles mentioned in 'Lighting Abstracts' the following list gives the full title of journals referred to and the addresses at which they are published. The addresses given are believed to be correct but no guarantee in this respect can be given. All articles or papers abstracted are understood to be generally available. Unless otherwise stated in the abstract the language in which the article or paper is written is English. Copies of articles or papers cannot be supplied from the offices of *Light and Lighting*.

Bull Soc. Franç. Elect.	*Bulletin de la Société Française des Electriciens*, 8–14 Avenue Pierre Larouse, Malakoff (Seine), France.
Bull. Assoc. Suisse Elect.	*Bulletin de l'Association Suisse des Electriciens*, Seefeldstrasse 301, Zürich 8, Switzerland.
Byggmästaren	*Byggmästaren*, Kungsgatan 32, Stockholm, Sweden.
Electrical Construction and Maintenance	*Electrical Construction and Maintenance*, 330 West 42nd Street, New York 36, New York, USA.
Elektro-Post	*Die Elektro-Post*. Verlagsort (13b), Mindelheim, Germany.
Elektrotech. Zeits. (B)	*Elektrotechnische Zeitschrift (Ausgabe B)*, Brillerstrasse 99, Wuppertal-Elberfeld, Germany.
Elettrotecnica	*Elettrotecnica*, Associazione Elettrotecnica Italiana, Via S. Paolo 10, Milan, Italy.
Illum. Engng.	*Illuminating Engineering*, The Illuminating Engineering Society, 1860 Broadway, New York 23, New York, USA.
Int. Ltg. Rev.	*International Lighting Review*, PO Box 7048, Amsterdam, Netherlands.
J. Opt. Soc. Am.	*Journal of the Optical Society of America*, American Institute of Physics, 57 East 55th Street, New York 22, New York, USA.
Lichttechnik	*Lichttechnik*, Eichborndamm 141–167, Berlin-Borsigwalde, Germany.
Ljuskultur	*Ljuskultur*, Sveavagen 28–30, Stockholm, Sweden.
Lux	*Lux*, 108 Rue Denfort Rochereau, Paris (VIIIe), France.
Philips Res. Rep.	*Philips Research Reports*, Cleaver-Hume Press Ltd, 31 Wright's Lane, London, W8.
Philips Tech. Rev.	*Philips Technical Review*, N.V. Uitgeversmaatschappij Centrex (Centrex Publishing Co), Cederlaan 2, Eindhoven, The Netherlands.
Rev. gen. Elect.	*Revue Générale d'Electricite*, 12 Place Henri-Bergson, Paris (VIIIe), France.
Trans. Illum. Eng. Soc. (London)	*Transactions of the Illuminating Engineering Society*, The Illuminating Engineering Society, 32 Victoria Street, London, SW1.
Trans. S. African Inst. Elect. Engrs.	*Transactions of the South African Institute of Electrical Engineers*, Kelvin House, Marshall and Holland Streets [PO Box 5907], Johannesburg, South Africa.

MISCELLANY

Book Reviews

'Optics', by C. J. Smith. Pp. 736+vii; *Figs.* 412. *Published by Edward Arnold (Publishers). Price* 63*s.*

This is Part III of the author's ambitious project of a complete degree physics for the B.Sc. General Degree course. The thoroughness of its coverage and the care with which it has been written cannot be too highly commended; although the author does not waste words, his style is admirably lucid and free from over-condensation, while the diagrams are carefully designed and clearly drawn.

It is most refreshing to find in a general book for students of optics no less than 120 pages devoted to photometry, light sources and colour. Only too often these subjects are dealt with in a way which gives the impression that they have been mentioned only because they appear in the syllabus. In marked contrast to such 'hole and corner' treatment, the author has clearly gone to considerable trouble to give them their proper place in a degree course and to ensure that his treatment is both up to date and accurate. Only in one small respect has he been misled, viz. when he ascribes to dilatation of the pupil what is mainly due to dark adaptation (p. 382). There is a useful collection of exercises at the end of each chapter and a good index.

J. W. T. W.

'Eye, Film and Camera in Color Photography', by R. M. Evans. Pp. 410+xii; *Figs.* 110 (16 *in colour*). *Published by Chapman and Hall. Price* 72*s.*

This book will interest many of the ever-increasing number of photographers who enjoy being talked to about their hobby by someone who combines detailed knowledge with a flair for exposition. The popularity of colour photography has resulted in many amateurs becoming much more dissatisfied with the results they receive back from the D & P House and has led to a certain amount of puzzled disappointment on the part of those who have been accustomed to obtaining monochrome prints which they and their friends found perfectly satisfactory. This new development in picture making has necessitated a considerable amount of re-thinking on what constitutes a 'good' photograph. Some analysis of the visual process (although at times reminiscent of the centipede who was asked how he managed his legs when walking) is necessary if the limitations as well as the potentialities of colour photography are to be appreciated for, as the author remarks in his preface, 'What an observer sees when he looks at a scene, can be and usually is very different from what he sees when he looks at an "accurate" colour photograph of that scene'. The author has set out to demonstrate and explain this fact, so familiar to all advanced colour workers, and both they and the not-so-advanced will be grateful to him—whether or not they have ever heard of the 'psi function'.

It should be mentioned that, in spite of the title, by far the greater part of the book is concerned with matters which interest the worker in monochrome just as much as the colour photographer. The illustrations are well selected so as to bring out the points made by the author. There is an extensive bibliography and an adequate index.

J. W. T. W.

'Electricity in Building', edited by T. Dannatt. Supplement to Architects' Year Book, Vol. 9, *pp.* 102. *Published by Elek Books Ltd, London. Price* 10*s.* 6*d.*

This supplement to Vol. 9 of the *Architects' Year Book* describes in a series of articles the distribution and control of electricity and the application of electricity to space heating, lighting for work, lifts and telephone systems. In the article on lighting, W. Robinson deals with minimum illumination requirements and the importance of avoiding discomfort glare. Tungsten and tubular fluorescent lamps are referred to, together with the types of lighting fitting in which they are used. The lighting of factories, offices and schools is given particular attention, and also 'designed appearance' lighting. In the articles on distribution and control, and on wiring, conduits and ducts, P. Honey includes descriptions of the supply of electricity for lighting purposes. The supplement includes a note on the Electrical Development Association and a glossary of electrical terms and symbols.

P. P.

Obituary

William Norman Coulson

THE DEATH has occurred suddenly, at his home, of Mr William Norman Coulson, Leicester Area Superintendent of the AEI Lamp and Lighting Co Ltd. Mr Coulson, who was 52, leaves a widow and two children. He started his career twenty-six years ago as a lamp sales representative at the Leicester depot of BTH and was appointed manager in 1940. He had held his last post since 1955. A Past-President of the Leicester Association of Engineers, Mr Coulson was also a founder member and a former honorary secretary of the Leicester Centre of the IES.

Personal

ATLAS LIGHTING LTD announce two recent appointments. Mr R. A. BIBBY is now representative in Northern Ireland. He joined Thorn Electrical Industries seven years ago as a representative covering part of the West Riding of Yorkshire, later being transferred to the Manchester Branch. Mr R. A. BARRINGTON is now Area Manager for the London North sales area, operating from the area sales office at 105 Judd Street, WC1. He joined Thorn Electrical Industries ten years ago as sales representative for the Central London postal district.

IES Meetings

LONDON

November 8

Twenty-five years of stage lighting, by F. P. Bentham. Federation of British Industries, 21 Tothill Street, SW1, 6 p.m.

December 13

Visual problems on motorways, by J. M. Waldram. Federation of British Industries, 21 Tothill Street, SW1.

CENTRES AND GROUPS

November 2

EDINBURGH. Lighting for photography, by R. W. Unwin. YMCA Social Room, 14 South St Andrew Street, 6.15 p.m.

NEWCASTLE UPON TYNE. Ship lighting, by J. T. Grundy. Room B7, The Percy Building, King's College, Queen Victoria Road, Newcastle, 6.15 p.m.

SWANSEA. Industrial lighting. Demonstration Theatre, South Wales Electricity Board, The Kingsway, Swansea, 6 p.m.

November 3

BIRMINGHAM. Ladies' Night. Botanical Gardens, Edgbaston, 7.30 p.m.

CARDIFF. Visit to Fire Station.

GLASGOW. Lighting for ships, by J. T. Grundy. Joint meeting with Institution of Engineers and Shipbuilders in Scotland, Weir Hall, 36 Elmbank Crescent, 6.30 p.m.

NOTTINGHAM. Horticultural lighting, by A. W. Gray. Electricity Centre, Carrington Street, Nottingham, 6 p.m., preceded in afternoon by visit to Lenton Horticultural Research Station.

November 9

MANCHESTER. Annual Dinner. Café Royal, Peter Street, Manchester, 6.30 p.m.

November 14

SHEFFIELD. History of lighting, by J. W. T. Walsh. Grand Hotel, Sheffield, 6.30 p.m.

November 15

PRESTON. Lighting of ships, by G. Carter and A. E. Fothergill. Demonstration Theatre, NW Electricity Board, 19 Friargate, 6.30 p.m.

November 21

BATH AND BRISTOL. Lighting for production, by W. Guscott. At South Western Electricity Board Demonstration Theatre, Bristol.

LEEDS. Eye strain and glare disabilities in relation to artificial lighting, by G. Black. British Lighting Council, 24 Aire Street, Leeds 1, 6.15 p.m.

November 25
CARDIFF. Annual Dinner Dance. St Mellons County Club.
GLASGOW. Luncheon meeting. Bath Hotel, 152 Bath Street, 12.30 p.m.
LEICESTER. Social evening. Coronation Hotel, 7.45 p.m.

November 28
BIRMINGHAM. Production of light sources, by H. R. Ruff. Regent House, St Phillip's Place, Colmore Row, Birmingham, 6 p.m.

December 1
CARDIFF. Lamp progress and its application to modern lighting installations.
NOTTINGHAM. The eye and artificial lighting, by W. J. Wellwood Ferguson. Electricity Centre, Carrington Street, Nottingham, 6 p.m.

December 5
LEEDS. Members' night. Interesting lighting installations, by members of the Centre. British Lighting Council, 24 Aire Street, Leeds 1, 6.15 p.m.
NEWCASTLE UPON TYNE. Looking at lighting, by A. Wilcock. County Hotel, Newcastle, 6.30 p.m.

December 7
EDINBURGH. The lighting of outdoor industrial plant, by J. G. Holmes. YMCA Social Room, 14 South St Andrew Street, 6.15 p.m.
SWANSEA. Lighting and industry in the Soviet Union, by E. H. Norgrove. Demonstration Theatre, South Wales Electricity Board, The Kingsway, Swansea, 6 p.m.

December 8
GLASGOW. The lighting of outdoor industrial plant, by J. G. Holmes. Joint meeting with ASEE, British Lighting Council, 26 St Vincent Place, Glasgow, C1, 6.30 p.m.
MANCHESTER. Ship lighting, by J. T. Grundy and C. H. Vaughan. Demonstration Theatre, North Western Electricity Board, Town Hall Extension, Manchester 2, 6 p.m.

December 12
LEICESTER. Stage lighting, by E. E. Faraday. At W. J. Furse, Nottingham, 6.15 p.m.

Situations

Vacant

Revo Electric Co Ltd require an additional LIGHTING SALES ENGINEER for operation from their expanding London Office, marketing new ranges of commercial and industrial lighting equipment. This appointment offers good salary and prospects to the right man who must be fully experienced and capable of handling complete projects. DIP. MIES preferred. Car provided. Pension scheme. Apply in confidence giving details of qualifications and experience to Manager, Southern Region, 30/31 Great Queen Street, London, WC2.

Industrial Notes

STREET FURNITURE on permanent exhibition can be seen on an outdoor site on London's South Bank, adjoining County Hall, from November 10 onwards. The exhibition, organized by the Council of Industrial Design, will provide a point of reference for lighting engineers, local authorities and others, and should help to reduce the time lapse between production of new designs and their public appearance.

THE CHANGING SCENE is the title of a new booklet published during the APLE Conference by EDA. It provides a brief review of those aspects of street lighting which concern the members and officers of local authorities. The booklet deals with four main aspects of the subject: safety, cost, amenity and future trends. On safety, it draws attention to an official statement that by installing good street lighting, a 30 per cent reduction in night-time road accidents can be achieved, which figure is regarded as conservative. In its discussion on cost, the booklet is wholly concerned with showing that part-night lighting is false economy. It emphasizes the sometimes forgotten fact that the laws of optics are rigorous and do not always conform to the dictates of aesthetics, and correct function is as important a part of the total amenity value as appearance. It can be obtained from the British Electrical Development Association, 2 Savoy Hill, London, WC2, gratis.

Postscript

IN THE LATEST ANNUAL REPORT of the Chief Inspector of Factories on Industrial Health, I find that 0·06 per cent of all male young persons examined in 1959 for certificates of fitness for employment in factories were refused a certificate on the ground of refractive errors. This is a very small proportion; nevertheless, errors of refraction of the eyes accounted for more rejections than any other kind of defect or disease. In fact, the number of certificates refused on this ground amounted to 36 per cent of all refusals, the next most common cause (skin affections) accounting for only 9 per cent of rejections. The case was very similar with female young persons as to the percentage of all examinees who were rejected for errors of refraction, i.e. 0·07 per cent. But this low percentage amounts to a much smaller proportion of the total rejections than that given for the male young persons; in fact, for 14·3 per cent instead of for 36 per cent of rejections. The preponderant cause of the unfitness of female young persons for factory employment was pediculosis—in the vernacular—lousiness! This accounted for 60 per cent of the rejections of female young persons, but for no more than 5·4 per cent of rejections of male young persons. However, since only between six and seven young persons in every 10,000 examined were unfitted for employment by refractive errors, these statistics lend no support to the assertion in certain lighting advertisements (not in this Journal) that the eyesight of the nation is deteriorating alarmingly. Actually, errors of refraction of the eyes are neither caused by bad lighting nor cured by good lighting.

MUCH MORE SURPRISING than the contents of the Chief Inspector's Report referred to above is the absence from it of any mention of the lighting in factories. Can it be that the state of lighting is now so satisfactory that it calls for no criticism? If the position is so gratifying it would seem to justify commendatory comment but, much as I wish it were so, I doubt whether factory lighting on a national scale is yet good enough for complacency. Undoubtedly, great improvement has been made since the last war, and it may be that merely from a statutory point of view there is now 'adequate and suitable lighting in all factories'. Let us hope this is so. It is noteworthy also that in the analysis by primary causation of reported accidents, bad lighting, or bad visibility due to inadequate or otherwise unsuitable lighting is not included among the specified *primary* causes. But this is not a new feature. If there were any factory accidents for which conditions of lighting were primarily responsible they are evidently included under the heading 'Not otherwise specified'. Seven per cent of the total accidents are thus classified but there is no knowing whether any of these were primarily due to faulty lighting.

AT A RECENT CONFERENCE on 'The Place of Ergonomics in Industry' one of the speakers referred to an instance in the application of this 'science of fitting the job to the worker' which is of special interest to lighting people. A team of 'ergonomists' trying to improve the lighting for 'clickers', i.e. men who cut out the uppers for boots and shoes, had to abandon their efforts owing to objection by the unions concerned, whose consent had not first been asked. This sort of thing affords one of the reasons—though a minor one by comparison with the large-scale touchiness in the matter of human relations between nations—for believing that he who first classified us as *homo sapiens* was of an ironic turn of mind!

APROPOS MY RECENT COMMENTS on windowless buildings and windowless aeroplanes, I was interested in reading one of Agatha Christie's thrillers, *Destination Unknown*, to find the following: 'The lighting was of the daylight type which tended to obscure the fact that there were no windows. Towards evening a fresh set of bulbs came on—soft and discreet night lighting.' 'Clever,' said Peters appreciatively, 'it all helps to minimize the feeling of being walled up alive.' A collection of comments made by other perceptive non-technical writers upon the lighting of interiors might be quite instructive to those who practise the art of lighting.

A VERY SENSIBLE IDEA has occurred to the development corporation at Welwyn Garden City New Town. They are building a number of bungalows specially designed for occupation by disabled people and are equipping them with outside flashing lights which the residents can operate to summon help in emergencies. The value of this device depends, of course, on the accessibility of the controlling switch to the occupant and, presumably, there will be more than one point from which the flashing light can be put into operation. The blue flashing lights which call patrolling police to police telephone booths have long been a familiar sight and it is time that a similar device was used to enable lonely incapacitated people to summon aid when need be. Unfortunately, emergencies occur by day as well as after dark and the flashing lights will lose some of their conspicuity when the day is bright.

IT IS UNFORTUNATE THAT if one happens to regard street lighting columns as necessary evils the sight of more than a hundred assorted specimens erected side by side is very likely to excite one's worst feelings about them. No doubt it is necessary to exhibit these utilities compactly for the purpose of the APLE annual conference, but whether it is wise to display them thus in a public thoroughfare—as at Folkestone—rather than to erect them in some more private place where they can be viewed dispassionately by prospective 'customers' is arguable. Even the most sylph-like columns, whose ophelimity at a spacing of 100 ft or so may be conceded, can lose what visual virtue they have when the spacing is cut to 10 ft or less.

'WHITER AND BRIGHTER ROAD LINES' reads a recent newspaper headline. This has nothing to do with any well-advertised detergent but is prompted by a BSI announcement about a new British Standard. According to this announcement, 'Ingredients and tests laid down in the Standard ensure true whiteness. Brightness (helpful in fog, rain or on unlit roads) is achieved by incorporating in the mixture small glass balls which reflect the light from a car's headlights back to the driver.' So, after all, BSI add 'brightness to whiteness'!

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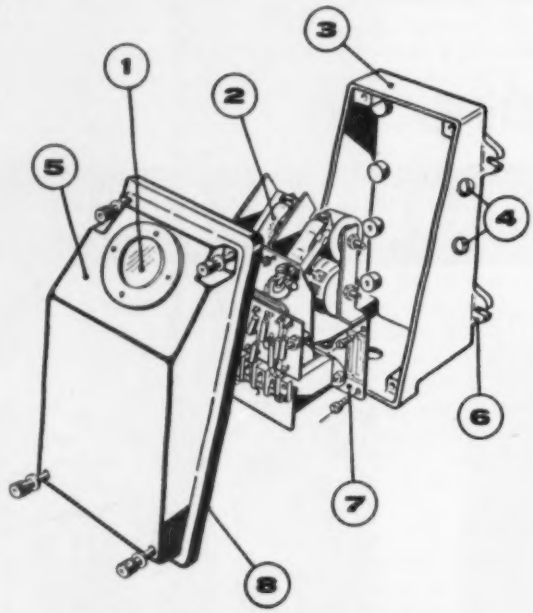

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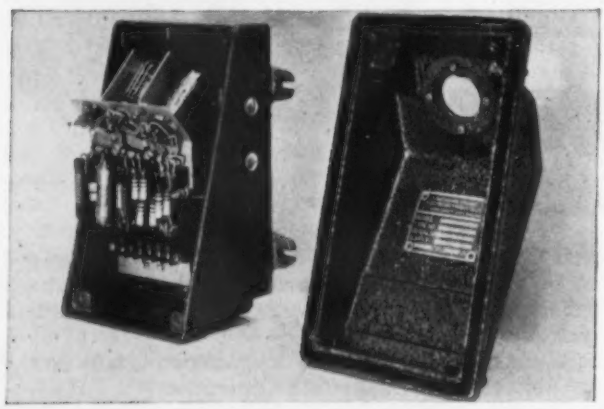

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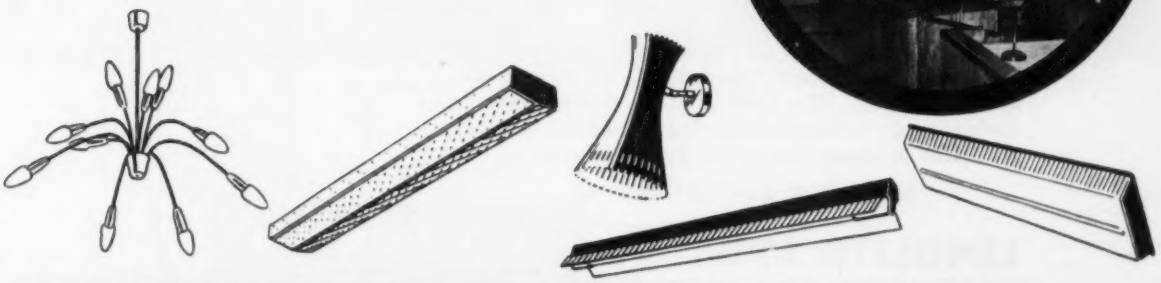

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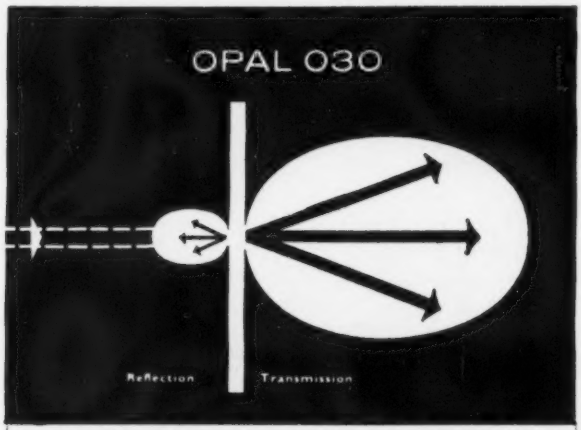
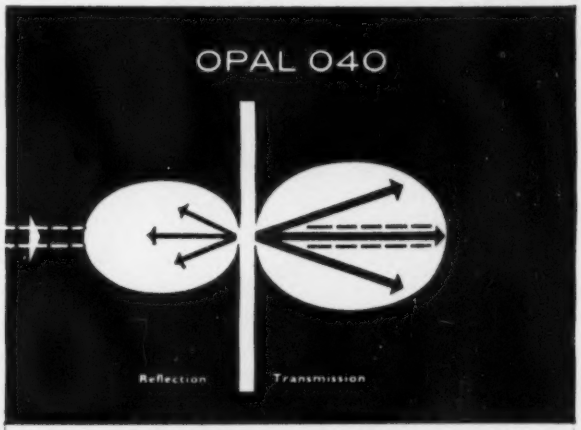
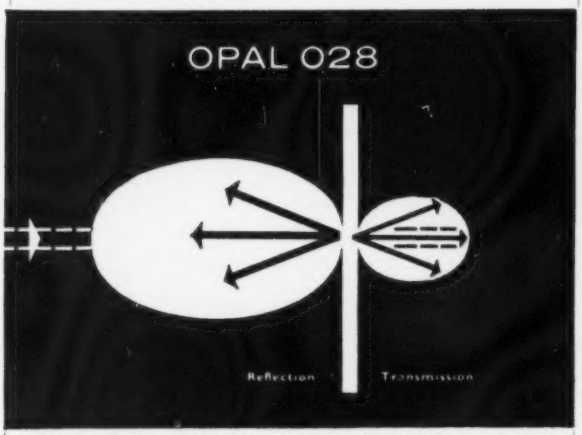


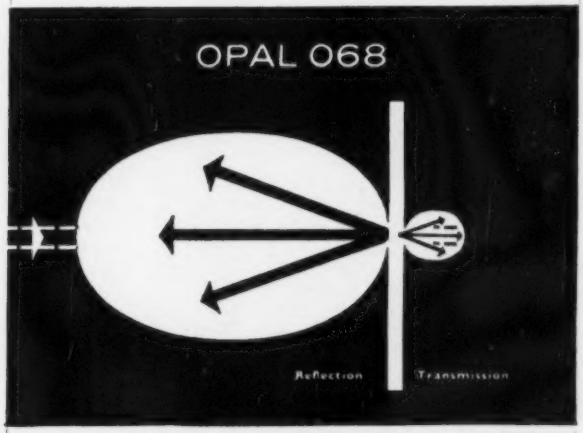
030 Transmission factor 0·78 Reflection factor 0·17
Diffusion factor 0·41



040 Transmission factor 0·55 Reflection factor 0·41
Diffusion factor 0·87



028 Transmission factor 0·28 Reflection factor 0·67
Diffusion factor 0·89



068 Transmission factor 0·08 Reflection factor 0·83
Diffusion factor 0·89

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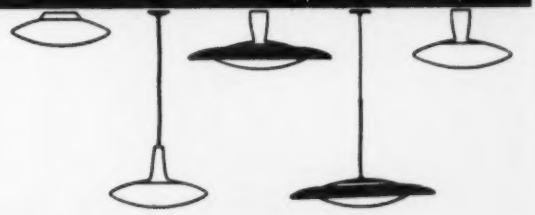

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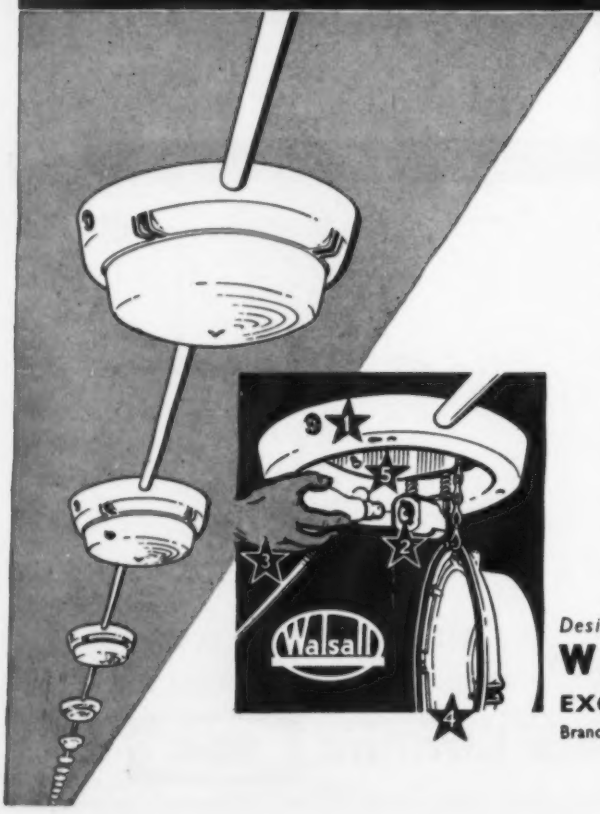

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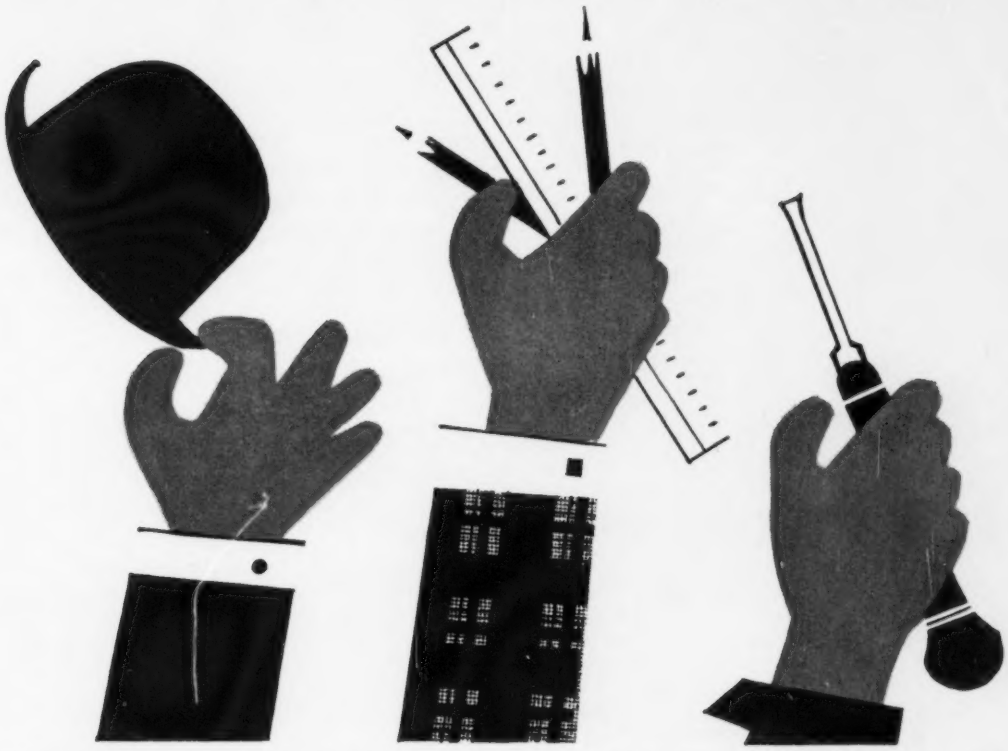

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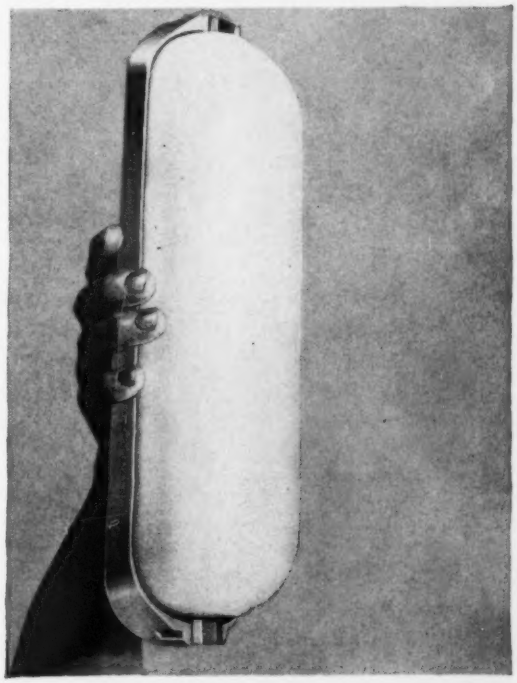

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